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NATIONAL DAM SAFETY PROGRAM. WHITE MEADOW LAKE DAM (NJ-00340), --ETC(U)
AUG 79 R J MCDERMOTT, J E GRIBBIN DACW61-79-C-0011

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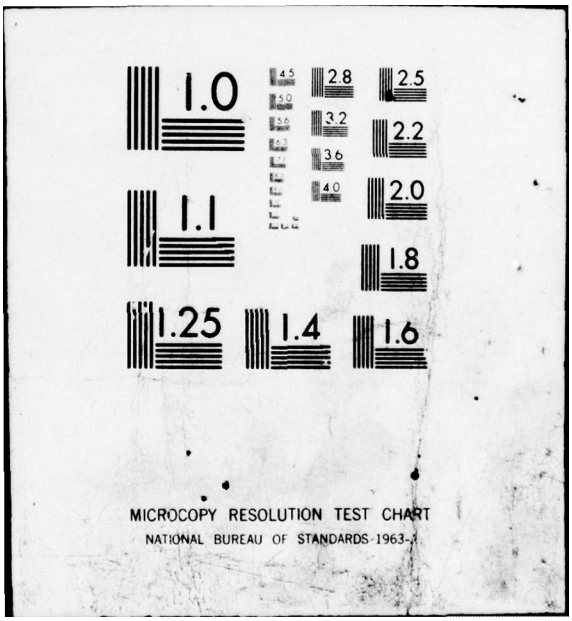
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PASSAIC RIVER BASIN
WHITE MEADOW BROOK,
MORRIS COUNTY
NEW JERSEY

LEVEL II

WHITE MEADOW LAKE DAM

NJ 00340

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

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DEPARTMENT OF THE ARMY
Philadelphia District
Corps of Engineers
Philadelphia, Pennsylvania

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August, 1979

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: NJ00340
2. GOVT ACCESSION NO.
3. RECIPIENT'S CATALOG NUMBER

4. TITLE (and Subtitle): Phase I Inspection Report
National Dam Safety Program
White Meadow Lake Dam
Morris County, N.J.

5. TYPE OF REPORT & PERIOD COVERED: (9) FINAL report
6. PERFORMING ORG. REPORT NUMBER

7. AUTHOR(s): (10) McDermott, Richard J. [redacted] /McDermott
Gribbin, John E. [redacted] /Gribbin

8. CONTRACT OR GRANT NUMBER(s): (15) DACW61-79-C-0011

9. PERFORMING ORGANIZATION NAME AND ADDRESS
Storch Engineers
110 Ridgedale Ave.
Florham Park, NJ 07932

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: (12) 139

11. CONTROLLING OFFICE NAME AND ADDRESS
U.S. Army Engineer District, Philadelphia
Custom House, 2d & Chestnut Streets
Philadelphia, Pennsylvania 19106

12. REPORT DATE: (11) August 1979
13. NUMBER OF PAGES: 75

14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)

15. SECURITY CLASS. (of this report): Unclassified
15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

(6) National Dam Safety Program. White Meadow Lake Dam (NJ-00340), Passaic River Basin, White Meadow Brook, Morris County, New Jersey. Phase I Inspection Report.

18. SUPPLEMENTARY NOTES

Copies are obtainable from National Technical Information Service, Springfield, Virginia, 22151.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

White Meadow Lake Dam, N.J.
Spillways
Seepage
Structural Analysis
Visual inspection
National Dam Inspection Act Report

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report.

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
CUSTOM HOUSE—2 D & CHESTNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

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IN REPLY REFER TO
NAPEN-D

Honorable Brendan T. Byrne
Governor of New Jersey
Trenton, NJ 08621

25 SEP 1970

Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for White Meadow Lake Dam in Morris County, New Jersey which has been prepared under authorization of the Dam Inspection Act, Public Law 92-367. A brief assessment of the dam's condition is given in the front of the report.

Based on visual inspection, available records, calculations and past operational performance, White Meadow Lake Dam, a high hazard potential structure, is judged to be in fair overall condition. The spillway is considered seriously inadequate since eleven percent of the Probable Maximum Flood (PMF) would overtop the dam. The seriously inadequate spillway is assessed as an UNSAFE, non-emergency condition, until more detailed studies prove otherwise or corrective measures are completed. The classification of UNSAFE applied to a dam because of a seriously inadequate spillway is not meant to indicate the same degree of emergency as would be associated with an UNSAFE classification applied for a structural deficiency. It does mean, however, that based on an initial screening, and preliminary computations, there appears to be a serious deficiency in spillway capacity so that if a severe storm were to occur, overtopping and failure of the dam would take place, significantly increasing the hazard of loss of life downstream from the dam. To insure adequacy of the structure, the following actions, as a minimum, are recommended:

a. The spillway's adequacy should be determined by a qualified professional consultant engaged by the owner using more sophisticated methods, procedures, and studies within six months from the date of approval of this report. Any remedial measures necessary to insure the adequacy of the spillway and to prevent overtopping should be initiated within calendar year 1980. In the interim, a detailed emergency operation plan and warning system, should be promptly developed. Also, during periods of unusually heavy precipitation, around-the-clock surveillance should be provided.

b. Within six months from the date of approval of this report, engineering studies and analyses should be performed to determine the dam's embankment and foundation condition and structural stability. This should include test borings to determine material properties relative to stability and seepage and installation of piezometers to facilitate seepage studies. Any remedial measures found necessary should be initiated within calendar year 1980.

c. Within six months from the date of approval of this report, the following remedial measures should be undertaken by the owner:

(1) All trees on the embankment should be cut off at ground level.

(2) The submerged portions of the spillway and inaccessible portions of the outlet pipe should be inspected for distress and deterioration with the lake drawn down. Concrete surfaces in the spillway should be sand blasted and coated with an epoxy sealant after all cracks are thoroughly inspected and pressure grouted. The outlet pipe should be renovated if necessary.

(3) A formal program of annual inspection and maintenance for the dam should be initiated. The inspection should be performed by a professional engineer experienced in the design and construction of dams and the observations and measurements should be recorded on standardized check-list forms. Inspection check-lists and complete records of maintenance should be included in a permanent file.

Repairs should be performed as required and the following maintenance should be performed annually: remove trees from the embankment, fill and stabilize eroded area, clear debris from the spillway and the downstream channel. The current practice of periodically lowering the lake for maintenance purposes should be continued and at least once every five years the lake should be completely drained to permit a thorough inspection and repair of the dam appurtenances.

d. Within 12 months from the date of approval of this report, a detailed topographic survey of the dam and area around the dam, based on USGS datum, should be undertaken by a qualified licensed land surveyor or professional engineer. The survey map should become part of the permanent record.

NAPEN-D
Honorable Brendan T. Byrne

A copy of the report is being furnished to Mr. Dirk C. Hofman, New Jersey Department of Environmental Protection, the designated State Office contact for this program. Within five days of the date of this letter, a copy will also be sent to Congressman James A. Courter of the Thirteenth District. Under the provision of the Freedom of Information Act, the inspection report will be subject to release by this office, upon request, five days after the date of this letter.

Additional copies of this report may be obtained from the National Technical Information Services (NTIS), Springfield, Virginia 22161 at a reasonable cost. Please allow four to six weeks from the date of this letter for NTIS to have copies of the report available.

An important aspect of the Dam Safety Program will be the implementation of the recommendations made as a result of the inspection. We accordingly request that we be advised of proposed actions taken by the State to implement our recommendations.

Sincerely,

JAMES G. TON
Colonel, Corps of Engineers
District Engineer

1 Incl
As stated

Copies furnished:
Mr. Dirk C. Hofman, P.E., Deputy Director
Division of Water Resources
N.J. Dept. of Environmental Protection
P.O. Box CN029
Trenton, NJ 08625

Mr. John O'Dowd, Acting Chief
Bureau of Flood Plain Management
Division of Water Resources
N.J. Dept. of Environmental Protection
P.O. Box CN029
Trenton, NJ 08625

WHITE MEADOW LAKE DAM (NJ00340)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 30 April 1979 by Storch Engineers under contract to the State of New Jersey. The State, under agreement with the U.S. Army Engineer District, Philadelphia, had this inspection performed in accordance with the National Dam Inspection Act, Public Law 92-367.

White Meadow Lake Dam, a high hazard potential structure, is judged to be in fair overall condition. The spillway is considered seriously inadequate since eleven percent of the Probable Maximum Flood (PMF) would overtop the dam. The seriously inadequate spillway is assessed as an UNSAFE, non-emergency condition, until more detailed studies prove otherwise or corrective measures are completed. The classification of UNSAFE applied to a dam because of a seriously inadequate spillway is not meant to indicate the same degree of emergency as would be associated with an UNSAFE classification applied for a structural deficiency. It does mean, however, that based on an initial screening, and preliminary computations, there appears to be a serious deficiency in spillway capacity so that if a severe storm were to occur, overtopping and failure of the dam would take place, significantly increasing the hazard of loss of life downstream from the dam. To insure adequacy of the structure, the following actions, as a minimum, are recommended:

a. The spillway's adequacy should be determined by a qualified professional consultant engaged by the owner using more sophisticated methods, procedures, and studies within six months from the date of approval of this report. Any remedial measures necessary to insure the adequacy of the spillway and to prevent overtopping should be initiated within calendar year 1980. In the interim, a detailed emergency operation plan and warning system should be promptly developed. Also, during periods of unusually heavy precipitation, around-the-clock surveillance should be provided.

b. Within six months from the date of approval of this report, engineering studies and analyses should be performed to determine the dam's embankment and foundation condition and structural stability. This should include test borings to determine material properties relative to stability and seepage and installation of piezometers to facilitate seepage studies. Any remedial measures found necessary should be initiated within calendar year 1980.

c. Within six months from the date of approval of this report, the following remedial measures should be undertaken by the owner:

(1) All trees on the embankment should be cut off at ground level.

(2) The submerged portions of the spillway and inaccessible portions of the outlet pipe should be inspected for distress and deterioration with the lake drawn down. Concrete surfaces in the spillway should be sand blasted and coated with an epoxy sealant after all cracks are thoroughly inspected and pressure grouted. The outlet pipe should be renovated if necessary.

(3) A formal program of annual inspection and maintenance for the dam should be initiated. The inspection should be performed by a professional engineer experienced in the design and construction of dams and the observations and measurements should be recorded on standardized check-list forms. Inspection check-lists and complete records of maintenance should be included in a permanent file.

Repairs should be performed as required and the following maintenance should be performed annually: remove trees from the embankment, fill and stabilize eroded area, clear debris from the spillway and the downstream channel. The current practice of periodically lowering the lake for maintenance purposes should be continued and at least once every five years the lake should be completely drained to permit a thorough inspection and repair of the dam appurtenances.

d. Within 12 months from the date of approval of this report, a detailed topographic survey of the dam and area around the dam, based on USGS datum, should be undertaken by a qualified licensed land surveyor or professional engineer. The survey map should become part of the permanent record.

APPROVED: James G. Ton

JAMES G. TON
Colonel, Corps of Engineers
District Engineer

DATE: 22 Sep 1979

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
CUSTOM HOUSE—2 D & CHESTNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

IN REPLY REFER TO
NAPEN-D

13 SEP 1979

Honorable Brendan T. Byrne
Governor of New Jersey
Trenton, NJ 08621

Dear Governor Byrne:

This is in reference to our ongoing National Program for Inspection of Non-Federal Dams within the State of New Jersey. White Meadow Lake Dam (Federal I.D. No. NJ00340), a high hazard potential structure has recently been inspected. The dam is owned by the White Meadow Lake Property Owner's Association and is located on White Meadow Brook in Rockaway Township.

Using Corps of Engineers' screening criteria, it has been determined that the dam's spillway is seriously inadequate since approximately 11 percent of the Probable Maximum Flood would overtop the dam. The seriously inadequate spillway is assessed as an UNSAFE, non-emergency condition, until more detailed studies prove otherwise, or corrective measures are completed. The classification of UNSAFE applied to a dam because of a seriously inadequate spillway is not meant to indicate the same degree of emergency as would be associated with an UNSAFE unclassification applied for a structural deficiency. It does mean, however, that based on an initial screening and preliminary computations, there appears to be a serious deficiency in spillway capacity so that if a severe storm were to occur, overtopping and failure of the dam could take place, significantly increasing the hazard potential to loss of life downstream from the dam. As a result of this UNSAFE determination, it is recommended that the dam's owner take the following measures within 30 days of the date of this letter:

a. Engage the services of a qualified professional consultant to more accurately determine the spillway adequacy by using more detailed and sophisticated hydrologic and hydraulic analyses, and to recommend any remedial measures required to prevent overtopping of the dam.

b. In the interim, a detailed emergency operation plan and downstream warning system should be developed. Also, round-the-clock surveillance should be provided during periods of unusally heavy precipitation.

A final report on this Phase I Inspection will be forwarded to you within two months.

Sincerely,

JOEL T. CALLAHAN
Lieutenant Colonel, Corps of Engineers
Acting District Engineer

Copies Furnished:
Dirk C. Hofman, Actg. Deputy Director
Division of Water Resources
N.J. Dept. of Environmental Protection
P.O. Box CN029
Trenton, NJ 08625

John O'Dowd, Acting Chief
Bureau of Flood Plain Management
Division of Water Resources
N.J. Dept. of Environmental Protection
P.O. Box CN029
Trenton, NJ 08625

UNSAFE DAM
NATIONAL PROGRAM OF INSPECTION OF DAMS

a. NAME: White Meadow Lake Dam

b. ID NO.: NJ00340

c. LOCATION State: New Jersey County: Morris
River or Stream: White Meadow Brook.
Nearest D/S City or Town: Middletown.

d. HEIGHT: 15 feet.

e. MAXIMUM IMPOUNDMENT CAPACITY: 417 ac ft.

f. TYPE: Earthfill.

g. OWNER: White Meadow Lake Property Owners Association.

h. DATE GOVERNOR NOTIFIED OF UNSAFE CONDITIONS: 13 Sep 79.

i. CONDITION OF DAM RESULTING IN UNSAFE ASSESSMENT Preliminary report calculations indicate 11% of PMF would overtop the dam.

l. URGENCY CATEGORY: UNSAFE, Non-Emergency.

m. EMERGENCY ACTIONS TAKEN:
Gov. notified of this condition by District Engineer's letter of 13 Sep 79.

j. DESCRIPTION OF DANGER INVOLVED:
Overtopping and failure of the dam would significantly increase hazard potential to loss of life and property downstream of dam.

h. REMEDIAL ACTIONS TAKEN:
N.J.D.E.P. will notify dam's owner upon receipt of our letter.

k. RECOMMENDATIONS GIVEN TO GOVERNOR:
Within 30 days of date of District Engineer letter the owner do the following:
a. Engage the services of a qualified professional consultant to more accurately determine the spillway adequacy by using more detailed and sophisticated hydrologic and hydraulic analyses, and to recommend any remedial measures required to prevent overtoppoing of the dam.
b. In the interim, a detailed emergency operation plan and downstream warning system should be developed. Also, around-the-clock surveillance should be provided during periods of unusually heavy precipitation.

o. REMARKS: Final report, to be issued within six weeks, will have WHITE cover.

W. H. ZINK, Coordinator
Dam Inspection Program
U.S.A.E.D., Philadelphia

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	White Meadow Lake Dam, NJ00340
State Located:	New Jersey
County Located:	Morris
Drainage Basin:	Passaic River
Stream:	White Meadow Brook
Date of Inspection:	April 30, 1979

Assessment of General Condition of Dam

Based on visual inspection, past operational perrormance and Phase I engineering analyses, White Meadow Lake Dam is assessed as being in fair overall conditon.

Hydraulic and hydrologic analyses indicate that the spillway is seriously inadequate. The discharge capacity of the spillway is not sufficient to pass the designated spillway design flood (SDF) without an overtopping of the dam, and dam failure would significantly increase the hazard downstream over that which would exist without dam failure. (The SDF for white Meadow Lake Dam is equal to one-half the probable maximum flood.) The spillway can pass approximately 10 percent of the probable maximum flood, or 20 percent of the SDF. Therefore, the owner should engage a professional engineer experienced in the design and construction of dams soon to perform accurate hydraulic and hydrologic analyses relating to spillway capacity. Based on the findings of the analyses, remedial measures should be undertaken to prevent overtopping of the dam resulting from a storm equivalent to the SDF. In the interim, a detailed emergency operation plan and warning system should be promptly developed. Also, during periods of unusually heavy precipitation, around the clock surveillance should be provided.

In addition, a professional engineer experienced in the design and construction of dams should be engaged soon to investigate the structural stability of the dam. The investigation should include all measures necessary, such as: dye testing, borings and corings, to assess the structural stability of the dam.

It is further recommended that the following remedial measures be undertaken by the owner in the near future.

1) All trees on the embankment should be cut off at ground level.
2) The submerged portions of the spillway and inaccessible portions of the outlet pipe should be inspected for distress and deterioration with the lake drawn down. Concrete surfaces in the spillway should be sand blasted and coated with an epoxy sealant after all cracks are thoroughly inspected and pressure grouted. The outlet pipe should be renovated if necessary.

The owner of the dam should initiate, in the near future, a program of periodic inspection and maintenance, the complete records of which to be kept on file and made available to the public. A visual inspection of the dam and appurtenances by a professional engineer experienced in the design and construction of dams should be made annually and reported on a standardized check-list form. Repairs should be made as required and the following maintenance should be performed annually: remove trees from the embankment, fill and sod any eroded surfaces of the embankment and clear the downstream channel. The current practice of periodically lowering the lake for maintenance purposes should be continued and at least once every five years the lake should be lowered completely to permit a thorough inspection and repair of the dam and appurtenances.

A detailed topographic survey of the dam and area around the dam, based on USGS datum, should be undertaken by a qualified licensed land surveyor

or professional engineer in the near future. The survey map should become part of the permanent record mentioned above.

Richard J. McDermott, P.E.

John E. Gribbin, P.E.

OVERVIEW - WHITE MEADOW LAKE DAM

30 APRIL 1979

TABLE OF CONTENTS

	Page
ASSESSMENT OF GENERAL CONDITION OF DAM	i
OVERVIEW PHOTO	iv
TABLE OF CONTENTS	v
PREFACE	vii
SECTION 1 - PROJECT INFORMATION	1
1.1 General	
1.2 Description of Project	
1.3 Pertinent Data	
SECTION 2 - ENGINEERING DATA	9
2.1 Design	
2.2 Construction	
2.3 Operation	
2.4 Evaluation	
SECTION 3 - VISUAL INSPECTION	11
3.1 Findings	
SECTION 4 - OPERATIONAL PROCEDURES	15
4.1 Procedures	
4.2 Maintenance of Dam	
4.3 Maintenance of Operating Facilities	
4.4 Description of Warning System	
4.5 Evaluation of Operational Adequacy	

TABLE OF CONTENTS (cont.)

	Page
SECTION 5 - HYDRAULIC/HYDROLOGIC	17
5.1 Evaluation of Features	
SECTION 6 - STRUCTURAL STABILITY	20
6.1 Evaluation of Structural Stability	
SECTION 7 - ASSESSMENT AND RECOMMENDATIONS	22
7.1 Dam Assessment	
7.2 Recommendations	
PLATES	
1 KEY MAP	
2 VICINITY MAP	
3 SOIL MAP	
4 GENERAL PLAN	
5 SPILLWAY SECTION	
6 DAM SECTIONS	
7 PHOTO LOCATION PLAN	
APPENDICES	
1 Check List - Visual Inspection	
Check List - Engineering Data	
2 Photographs	
3 Engineering Data	
4 Hydrologic Computations	
5 Bibliography	

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 30214. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. It is important to note that the condition of dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that the unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

WHITE MEADOW LAKE DAM, I.D.NJ00340

SECTION 1: PROJECT INFORMATION

1.1 General

a. Authority

Public Law 92-367, August 8, 1972 authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The Division of Water Resources of the New Jersey Department of Environmental Protecton (NJDEP) in cooperation with the Philadelphia District of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the State of New Jersey. Storch Engineers has been retained by the NJDEP to inspect and report on a selected group of these dams. The NJDEP is under agreement with the Philadephia District of the Corps of Engineers.

b. Purpose of Inspection

The visual inspection of White Meadow Lake Dam was made on April 30, 1979. The purpose of the inspection was to make a general assessment of the structural integrity and operational adequacy of the dam structure and its appurtenances.

1.2 Description of Project

a. Description of Dam and Appurtenances

White Meadow Lake Dam is an earthfill dam with a straight concrete weir spillway and a gated 36-inch corrugated metal pipe outlet works.

Flow from the spillway enters an earth discharge channel which, in turn, discharges over a secondary concrete weir 80 feet downstream from the dam. Discharge from the secondary weir flows under White Meadow Road into White Meadow Brook and eventually enters the Rockaway River.

The earthfill embankment is about 300 feet long and extends north to south. The embankment crest is about 20 feet wide and the entire length is paved with a concrete and asphalt pedestrian walkway. Both upstream and downstream faces are vertical along the entire dam length. The upstream face is protected by a concrete wall and the downstream face by a stone masonry wall. Along the south section of the downstream face, the stone masonry is constructed in two tiers.

The spillway consists of a free-overflow concrete broad-crested weir, 29 feet in length. The width of the spillway is equal to the width of the dam. A timber pedestrian walkway and diving platform span the full length of the spillway.

The crest of dam, at elevation 753.7, is 1.0 foot above the crest of the spillway. The maximum height of the dam is 15 feet.

The outlet works consists of a 36-inch corrugated metal pipe transversely penetrating the dam at the spillway. A lift gate, with operating stem projecting through the crest of the spillway, controls flow through the pipe.

b. Location

White Meadow Lake Dam is located in the Township of Rockaway, Morris County, New Jersey. Constructed across White Meadow Brook, the dam impounds White Meadow Lake which is the recreation focus of a residential development. The dam is readily accessible by local roads.

c. Size and Hazard Classification

Size and Hazard Classification criteria presented in "Recommended Guidelines for Safety Inspection of Dams", published by the U.S. Army Corps of Engineers are as follows:

SIZE CLASSIFICATION

	Impoundment	
Category	Storage (Ac-ft)	Height (Ft)
Small	< 1000 and ≥ 50	< 40 and ≥ 25
Intermediate	≥ 1000 and < 50,000	≥ 40 and < 100
Large	≥ 50,000	≥ 100

HAZARD POTENTIAL CLASSIFICATION

Category	Loss of Life (Extent of Development)	Economic Loss (Extent of Development)
Low	None expected (no permanent structures for human habitation)	Minimal (Undeveloped to occasional structures or agriculture)
Significant	Few (No urban developments and no more than a small number of inhabitable structures)	Appreciable (Notable agriculture, industry or structures)
High	More than few	Excessive (Extensive community, industry or agriculture)

The following characteristics relating to size and downstream hazard for White Meadow Lake Dam have been determined for this Phase I assessment:

Storage: 417 Acre-feet

Height: 15 feet

Potential Loss of Life:

Several dwellings are located in the downstream SDF flood plain. Within 1300 feet of the dam, approximately 5 of these dwellings would be inundated to heights of 0.5 feet to 2 feet above the first floor as a result of dam failure due to overtopping resulting in the potential loss of more than a few lives. A dam breach analysis is contained in Appendix 4.

Potential Economic Loss:

Damage could be sustained by at least two secondary road bridges and several dwellings downstream of the dam as a result of dam failure due to overtopping.

Therefore, White Meadow Lake Dam is classified as "Small" size and "High" hazard potential.

d. Ownership

White Meadow Lake Dam is owned and operated by White Meadow Lake Property Owners' Association, 100 White Meadow Road, Rockaway, N.J. 07866.

e. Purpose of Dam

The purpose of the dam is the impoundment of a lake used for recreation.

f. Design and Construction History

White Meadow Lake Dam reportedly was constructed prior to 1945. In that year, the developer of the area bought the lake and surrounding properties from Warren Foundry & Pipe Corp. No plans for the construction of the dam could be obtained for this report.

g. Normal Operational Procedures

The dam and appurtenances are operated and maintained by White Meadow Lake Property Owners' Association. There is no regular schedule of maintenance or operation. Repairs are made on an "as needed" basis.

Reportedly, the outlet works gate is generally not opened during times of high lake levels. The outlet works is used to drain the lake for maintenance of lake related structures.

1.3 Pertinent Data

a. Drainage Area — 2.9 square miles

b. Discharge at Damsite

Maximum flood at damsite	Unknown
Outlet works at pool elevation	78 c.f.s.
Spillway capacity at top of dam	76 c.f.s.

c. Elevation (Feet above MSL)

Top of dam	753.7
Maximum pool-design surcharge	755.1
Recreation pool	753.0
Spillway crest	752.7
Stream bed at centerline of dam	738.6
Maximum tailwater	744.0 (Estimated)

d. Reservoir

Length of maximum pool	5,800 feet (Estimated)
Length of recreation pool	5,400 feet (Scaled)
Length of flood control pool	N.A.

e. Storage (Acre-feet)

Recreation pool	320 acre-feet
Flood control pool	N.A.
Maximum pool	618 acre-feet
Top of dam	417 acre-feet

f. Reservoir Surface (Acres)

Top of dam	142 acres (Estimated)
Maximum pool	151 acres (Estimated)
Flood control pool	N.A.
Recreation pool	137 acres
Spillway crest	137 acres

g. Dam

Type	Earthfill
Length	300 feet
Height	15 feet
Sideslopes - Upstream	Vertical
- Downstream	Vertical
Zoning	Unknown
Impervious core	Unknown
Cutoff	Unknown
Grout curtain	Unknown

h. Diversion and Regulating Tunnel — N.A.

i. Spillway

Type	Uncontrolled concrete weir
Length of weir	29 feet
Crest elevation	752.7
Gates	N.A.
Approach channel	N.A.
Discharge channel	Earth channel with concrete weir at downstream end.

j. Regulating Outlet

36-inch gated CMP outlet

SECTION 2: ENGINEERING DATA

2.1 Design

No calculations, reports nor plans pertaining to the design of the dam are available.

2.2 Construction

No data nor reports pertaining to the construction of the dam are available.

2.3 Operation

No records of operation of the lake or dam and no inspection reports subsequent to construction are available.

2.4 Evaluation

a. Availability

No engineering information is available for the subject dam.

b. Adequacy

Available engineering data pertaining to White Meadow Lake Dam is not adequate to be of significant assistance to the performance of a Phase I evaluation. A list of absent information is included in paragraph 7.1.b.

c. Validity

The validity of engineering data cannot be assessed due to the absence of data.

SECTION 3: VISUAL INSPECTION

3.1 Findings

a. General

The inspection of White Meadow Lake Dam took place on April 30, 1979 by members of the staff of Storch Engineers. A copy of the visual inspection check list is contained in Appendix 1. The following procedures were employed for the inspection:

1) The embankment of the dam, appurtenant structures and adjacent areas were examined.
2) Areas of suspected seepage were noted and located.
3) The embankment and appurtenant structures were measured and key elevations determined with the use of a surveyor's level.
4) The embankment and appurtenant structures and adjacent areas were photographed.

b. Dam

The entire length of the dam crest is paved for pedestrian use. The upstream portion of the pavement is concrete while the remaining portion is bituminous. The concrete pavement generally is in adequate condition with some settlement noted. Also, some bituminous patches were observed on the concrete pavement. The bituminous pavement generally is in adequate condition with several longitudinal cracks approximately 2 feet from the downstream edge and one small area of failure in the north section resembling a "pothole."

The concrete wall comprising the upstream face of embankment is in generally adequate condition. The south section of wall appears to have a "shotcrete" surface. The construction joint between the wall and the concrete pavement is in generally satisfactory condition with some separation noted along the south section.

The stone wall along the north section of the downstream face of embankment is in generally satisfactory condition. The south half of this wall is stone masonry while the north half consists of ungrouted stone. The stone masonry wall along the south section is constructed in two tiers. A portion of the lower tier is tilted in the downstream direction.

A few trees and shrubs are located along the downstream side of the crest of dam and along the lower tier of the stone masonry wall on the downstream face of dam.

Two seepage zones were observed at the toe of the south section of the dam. One zone, located about 36 feet south of the spillway, was manifest as a wet area while the other zone, located about 2 feet south of the spillway, was in the form of discharge issuing through rocks comprising the toe of dam.

Beyond the south end of the dam is a beach area and at the north end of the dam a club house owned by White Meadow Lake Property Owners' Association is located. The lawn is less than 0.5 foot above water level and is protected from inundation by a concrete wall 1 foot in height above lake level. Several wet lawn areas were observed behind the concrete wall indicating that it provides inadequate protection against inundation.

The generalized soil description of the dam site consists of alluvial soil composed of stratified materials deposited by streams overlying glacial terminal moraine. The moraine consists of an unassorted and heterogeneous mixture of materials, ranging in size from clay to boulders, deposited at the outer edge of the ice sheet during the Wisconsin stage of continental glaciation. The glacial terminal moraine overlies Pre-Cambrian bedrock consisting of Losee gneiss.

c. Appurtenant Structures

The spillway crest appears to be in fair condition. Some debris has accumulated on the weir crest and the concrete surface appeared to be eroded with aggregate exposed. A crack 1/8 inch wide and running in a diagonal direction was observed at the south spillway training wall. A group of large rocks at the downstream side of the spillway serve as an energy dissipator.

The lift gate could not be observed at the time of inspection and the corrugated metal outlet pipe appeared to be in deteriorated condition. A flow of approximately 1 to 2 c.f.s. was observed discharging from the pipe. The gate operating mechanism appeared to be in adequate condition.

d. Reservoir Area

White Meadow Lake has a maximum length of about 1 mile with widths varying from 600 to 1200 feet. The entire shore line is developed and three swim areas are located around the lake. The slope of the shore line varies from 5 to 20 percent. Most of the watershed area is wooded with residential development.

e. Downstream Channel

Discharge from White Meadow Lake Dam enters White Meadow Brook and then Beaver Brook. A bridge supporting White Meadow Road, a secondary road, is located about 100 feet downstream from the dam. Beyond the bridge the channel is aligned through residential and industrial areas for approximately 1.2 miles and before joining Beaver Brook. White Meadow Brook has a well defined channel with thickly wooded banks and no significant obstructions in the vicinity of the dam.

SECTION 4: OPERATIONAL PROCEDURES

4.1 Procedures

The water level in White Meadow Lake is naturally controlled by overflow over the spillway. Operation of the dam consists of lowering the lake about 3 feet each year for lake related maintenance. Reportedly, the time required to lower the lake 3 feet is approximately 2 weeks.

4.2 Maintenance of Dam

Maintenance of the dam is performed on an "as needed" basis. Reportedly, six years ago, the concrete wall on the upstream side of the south section of the dam was repaired by the application of shotcrete. The pavement on the crest of dam is patched as the need arises. A full-time maintenance crew is employed by White Meadow Lake Property Owners' Association whose duties include dam maintenance.

4.3 Maintenance of Operating Facilities

Maintenance of operating facilities is performed on an "as needed" basis. Reportedly, the most recent maintenance was performed about 4 or 5 years ago when the gate lift channels were replaced.

4.4 Description of Warning System

Reportedly, the maintenance crew monitors the water level in the lake during storms and informal communication is occasionally established with officials in the Township of Denville, downstream from the dam.

4.5 Evaluation of Operational Adequacy

Operation of the dam has not been successful in that the dam reportedly has been overtopped about twice a year. Reportedly, no damage was done by the overtoppings.

Maintenance documentation could not be obtained for this report. However, reportedly, the maintenance crew reports to the Board members of the Property Owners' Association. The following areas of maintenance appear to be insufficient:

1. Trees allowed to grow on embankment.
2. Erosion of soil under asphalt pavement near downstream side of crest not repaired.
3. Damaged fence on dam not repaired.
4. Debris allowed to accumulate on spillway crest.
5. Settled concrete pavement on upstream side of dam crest not repaired.
6. Deteriorated outlet pipe not renovated.
7. Leakage through outlet works not corrected.

SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. Design Data

The quantity of storm water runoff that the spillway should be able to pass without an overtopping of the dam is based on the size and hazard classification of the dam. This runoff, called the Spillway Design Flood (SDF), is described in terms of frequency or probable maximum flood (PMF) depending on the extent of the dam's size and potential hazard. According to the "Recommended Guidelines for Safety Inspection of Dams," published by the U.S. Army Corps of Engineers, the SDF for White Meadow Lake Dam falls in a range of 1/2 PMF to PMF. In this case, the low end of the range, 1/2 PMF, is chosen since the factors used to select size and hazard classification are on the low side of their respective ranges.

The SDF hydrograph for White Meadow Lake was derived by the combination of the outflow hydrograph for Mt. Hope Lake Dam and the inflow hydrograph from the drainage area between Mt. Hope Lake and White Meadow Lake.

Computations of the inflow hydrograph for both sub-areas were performed by the HEC-1-DB computer program using the SCS triangular method with curvelinear transformation. The combination of the two hydrographs, routing through White Meadow Lake Dam and downstream routing were also included in the program (See printout in Appendix 4). The calculated SDF peak inflow for White Meadow Lake Dam is 2757 c.f.s.

Discharge capacity for White Meadow Lake Dam was computed by considering free discharge over the crest of spillway which was assumed to have the characteristics of a broad crested weir.

In routing the SDF through White Meadow Lake it was found that the dam would be overtopped to a height of 1.4 feet for a duration of 10.4 hours in a non-breach condition. A dam breach analysis was then performed using a trapezoidal breach of 120 feet bottom length. The peak breach outflow was computed to be 7323 c.f.s. The breach analysis indicates that the maximum water levels at two downstream locations 350 feet and 1150 feet downstream are approximately 738.5 and 721.8, respectively. These elevations represent inundation of up to 2 feet above first floor levels of about 5 downstream dwellings. A breach analysis is located in Appendix 4.

Since a storm equivalent to the SDF would result in overtopping and failure of the dam, and outflow during failure would significantly increase the downstream hazard over that which would exist without dam failure, the spillway is assessed as being seriously inadequate in accordance with criteria established by the U.S. Army Corps of Engineers.

b. Experience Data

The dam reportedly overtops about twice a year due to high water level combined with wave action.

c. Visual observation

No conclusive evidence was found at the time of inspection that would indicate that the dam had been eroded by overtopping.

d. Overtopping Potential

As indicated in paragraph 5.1.a, a storm of magnitude equivalent to the SDF would cause overtopping of the dam to a height of 1.4 feet. Computations indicate that the dam can pass approximately 10 percent of the PMF (or 20 percent of the SDF) without being overtopped.

SECTION 6: STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

The embankment appeared, at the time of inspection, to be generally outwardly stable. However, some indications of possible distress were noted. Included among these are cracks in the bituminous pavement on the crest, a small section of pavement failure, tilting of the downstream stone masonry wall and two zones of seepage. An accurate determination of the severity of the observed seepage and other indications of possible distress cannot be made without further investigation beyond the scope of a Phase I inspection.

b. Design and Construction Data

Analysis of structural stability and construction data for the embankment and spillway structure are not available.

c. Operating Records

No operating records are available for the dam.

d. Post Construction Changes

No records of any post construction changes are available.

e. Seismic Stability

White Meadow Lake Dam is located in Seismic Zone 1 as defined in "Recommended Guideline for Safety Inspection of Dams,"

which is a zone of very low seismic activity. Experience indicates that dams in Seismic Zone 1 will have adequate stability under seismic loading conditions if stable under static loading conditions. White Meadow Lake Dam appeared, at the time of inspection, to be generally outwardly stable.

SECTION 7: ASSESSMENT AND RECOMMENDATIONS

7.1 Dam Assessment

a. Safety

Based on hydraulic and hydrologic analyses outlined in Section 5 and Appendix 4, the spillway of White Meadow Lake Dam is assessed as being seriously inadequate. The spillway is not able to pass one-half of the PMF and dam failure would significantly increase the downstream hazard over that which would exist without dam failure.

The dam appeared to be generally outwardly stable based on field inspection. The observed seepage, cracks and other signs of possible distress are not considered to be an immediate indication of instability. However, sufficient data is not available to allow a complete assessment of the present structural condition of the dam and appurtenances.

b. Adequacy of Information

Information sources for this study include 1) field investigations, 2) USGS quadrangle sheet, 3) aerial photography from Morris County, 4) consultation with maintenance and operation personnel for the Property Owners' Association and 5) topographic map from Township of Rockaway.

The information obtained is sufficient to allow a Phase I assessment as outlined in "Recommended Guidelines for Safety Inspection of Dams."

Some data not available are as follows:

1. Stream and lake gaging records.
2. Description of dam embankment structures and material.
3. Construction records.
4. Post construction records.
5. Description of foundation materials.
6. Construction and as-built drawings.

c. Necessity for Additional Data/Evaluation

Additional evaluation is considered necessary in order to assess the structural stability of the dam. The evaluation should be based on investigations as outlined in paragraph 7.2.c.

7.2 Recommendations

a. Remedial Measures

Based on hydraulic and hydrologic analyses outlined in paragraph 5.1.a, the spillway is considered to be seriously inadequate.

Therefore, it is recommended that a professional engineer experienced in the design and construction of dams be engaged soon to perform more acurate hydraulic and hydrologic analyses relating to the spillway capacity. The analyses should more accurately determine runoff characteristics of the watershed and should refine the discharge capacity of the spillway and the downstream channel capacity.

Based on the findings of these analyses, the dam and spillway should be modified to prevent overtopping of the dam resulting from a storm equivalent to the SDF. In the interim, a detailed emergency operation plan and warning system should be promptly developed. Also, during periods of unusually heavy precipitation, around the clock surveillance should be provided.

It is further recommended that the following remedial measures be undertaken by the owner in the near future.

1) All trees on the embankment should be cut off at ground level.
2) The submerged portions of the spillway and inaccessible portions of the outlet pipe should be inspected for distress and deterioration with the lake drawn down. Concrete surfaces in the spillway should be sand blasted and coated with an epoxy sealant after all cracks are thoroughly inspected and pressure grouted. The outlet pipe should be renovated if necessary.

b. Maintenance

The owner of the dam should initiate in the near future a formal program of annual inspection and maintenance for the dam. The inspection should be performed by a professional engineer experienced in the design and construction of dams and the observations and measurements should be recorded on standardized check list forms. Inspection check-lists and complete records of maintenance should be included in a permanent file available for public inspection.

Repairs should be performed as required and the following maintenance should be performed annually: remove trees from

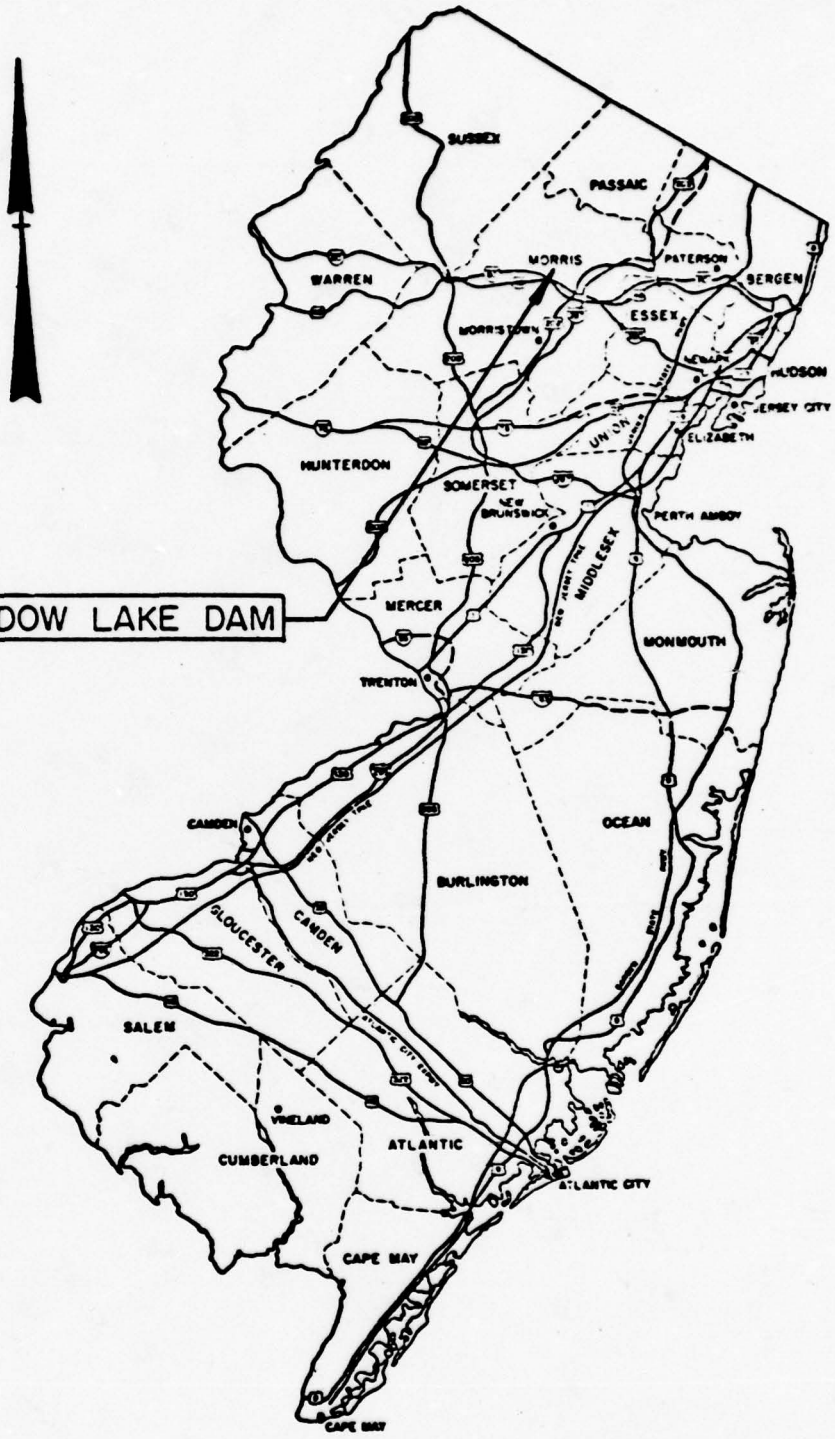
the embankment, fill and stabilize eroded area, clear debris from the spillway and the downstream channel. The current practice of periodically lowering the lake for maintenance purposes should be continued and at least once every five years the lake should be completely drained to permit a thorough inspection and repair of the dam and appurtenances.

c. Additional Studies

A professional engineer experienced in the design and construction of dams should be engaged soon to investigate the structural stability of the dam. The investigation should include all measures necessary, such as: dye testing, borings and corings, to assess the structural stability of the dam.

A detailed topographic survey of the dam and area around the dam, based on USGS datum, should be undertaken by a qualified licensed land surveyor or professional engineer in the near future. The survey map should become part of the permanent record mentioned in paragraph 7.2.b.

PLATES



WHITE MEADOW LAKE DAM

PLATE 1

STORCH ENGINEERS
FLORHAM PARK, NEW JERSEY

DIVISION OF WATER RESOURCES
N.J. DEPT. OF ENVIR. PROTECTION
TRENTON, NEW JERSEY

INSPECTION AND EVALUATION OF DAMS

KEY MAP

WHITE MEADOW LAKE DAM

I.D. N.J. 00340	SCALE: NONE
	DATE: JULY, 1979

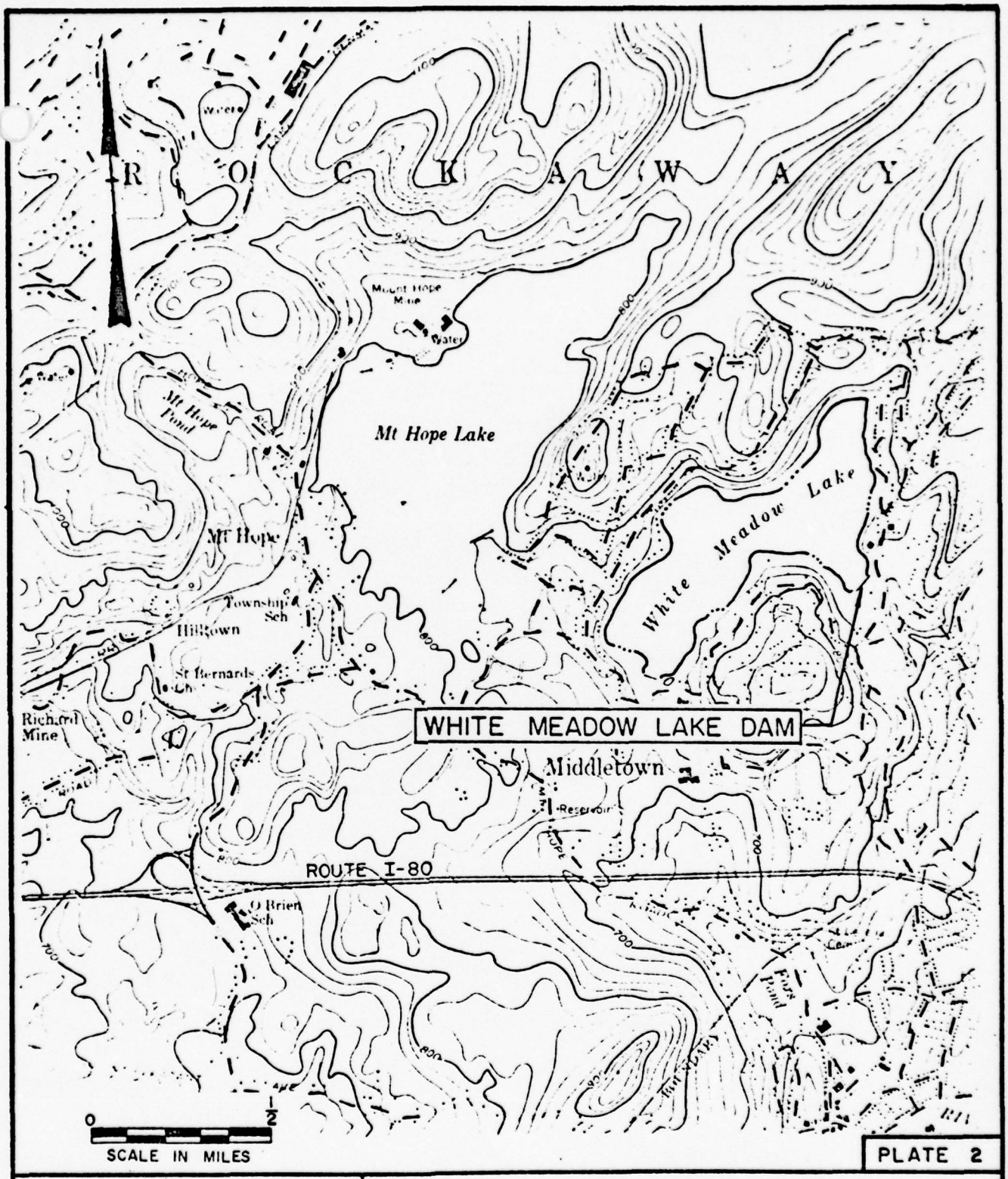


PLATE 2

STORCH ENGINEERS
FLORHAM PARK, NEW JERSEY

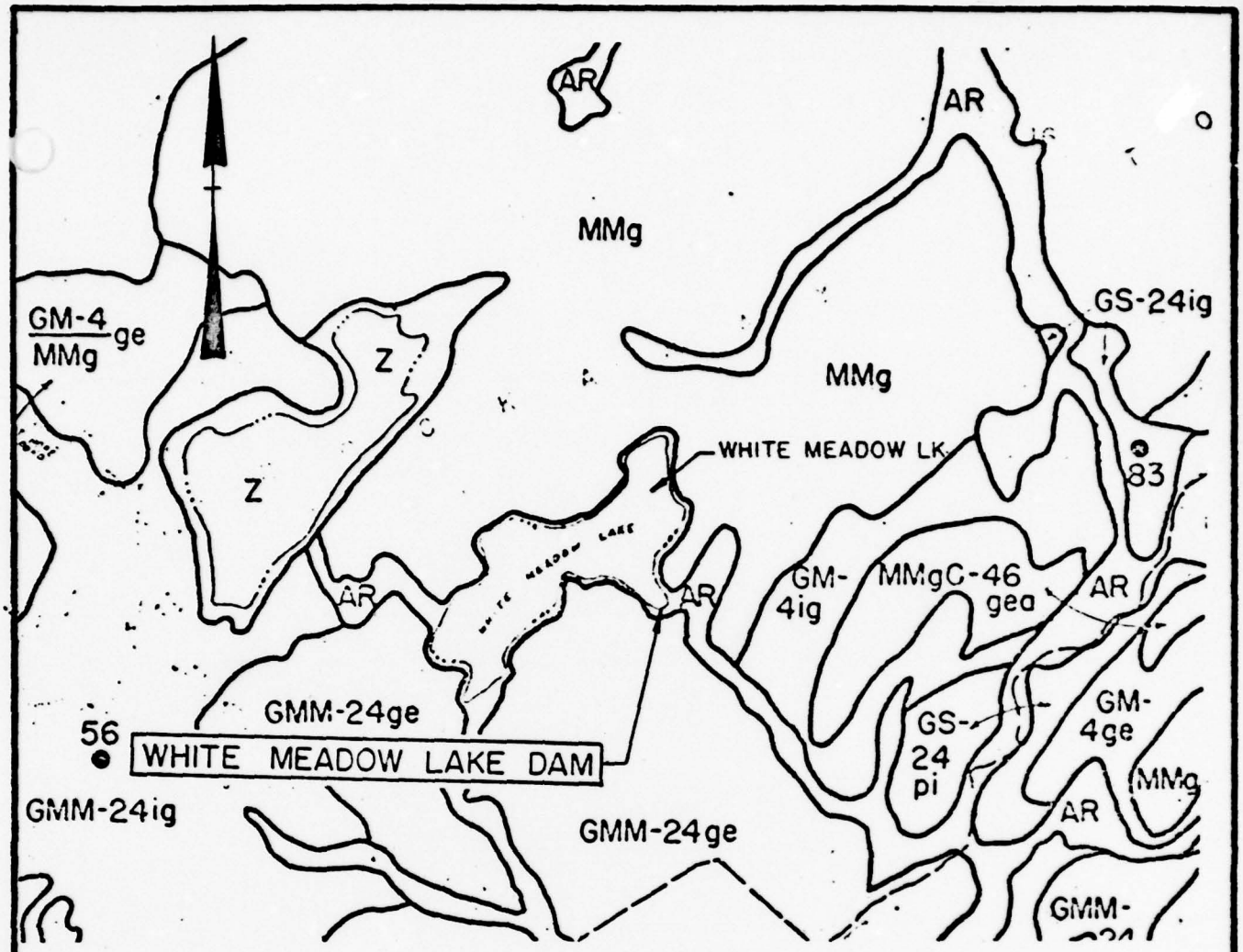
DIVISION OF WATER RESOURCES
N.J. DEPT. OF ENVIR. PROTECTION
TRENTON, NEW JERSEY

INSPECTION AND EVALUATION OF DAMS

VICINITY MAP

WHITE MEADOW LAKE DAM

I.D. NJ00340	SCALE: AS SHOWN
	DATE: JUNE, 1979



Legend

AR	Recent alluvium composed of stratified materials deposited by streams.
GMM-24	Glacial terminal moraine. Unassorted and heterogeneous mixture of materials, ranging in size from clay to boulders, deposited at the outer edge of the ice sheet during the Wisconsin stage of continental glaciation.
MMg	Gneissic bedrock at or near the surface. (Losee Gneiss, Pre-Cambrian formation.)
Note:	Information taken from Rutgers University Soil Survey of New Jersey, Report No. 9, Morris County, and Geologic Map of New Jersey prepared by Lewis and Kummel.

PLATE 3

STORCH ENGINEERS
FLORHAM PARK, NEW JERSEY

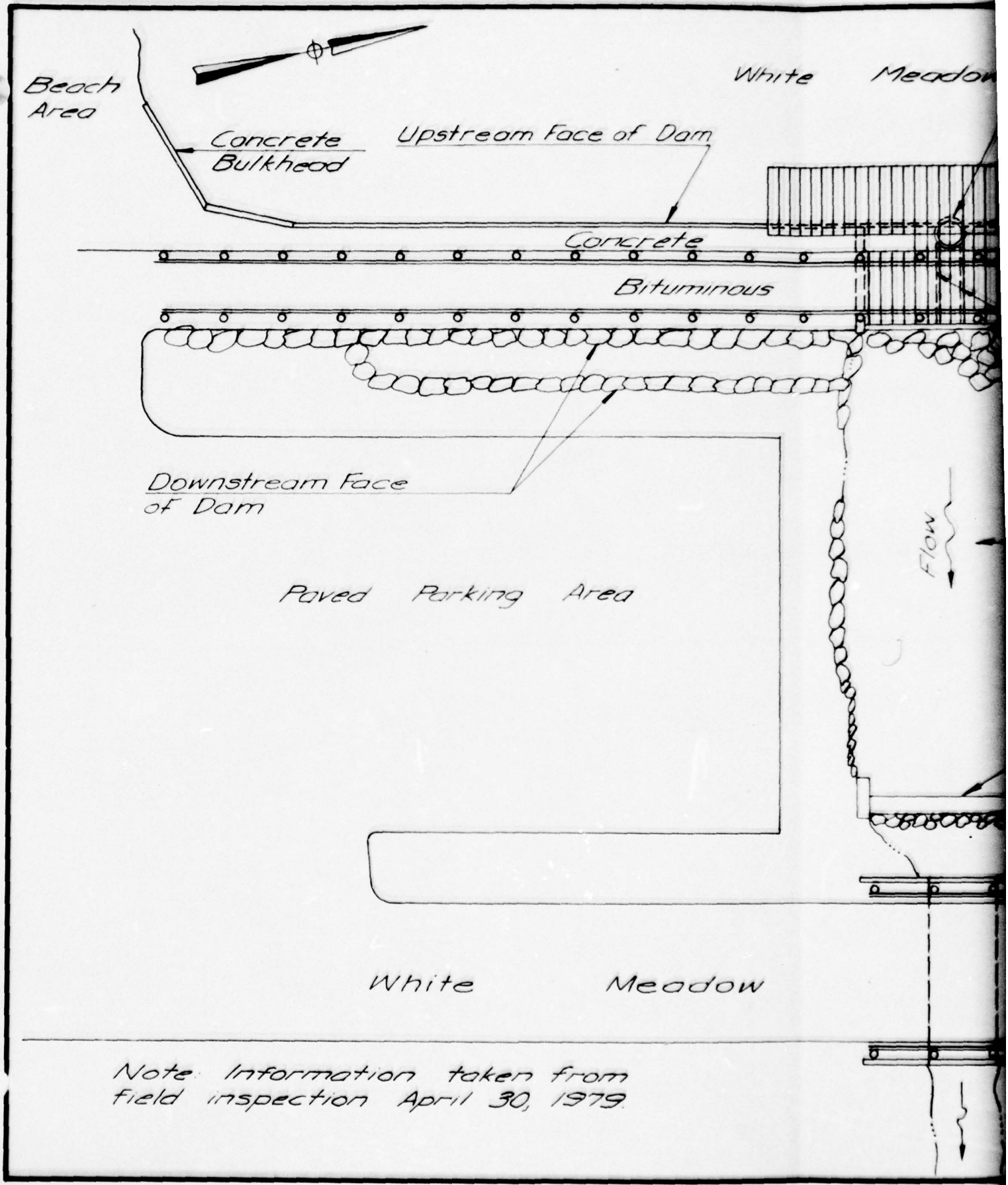
DIVISION OF WATER RESOURCES
N.J. DEPT. OF ENVIR. PROTECTION
TRENTON, NEW JERSEY

INSPECTION AND EVALUATION OF DAMS

SOIL MAP

WHITE MEADOW LAKE DAM

I.D. NJ00340	SCALE: NONE
	DATE: JUNE, 1979



Note: Information taken from field inspection April 30, 1979

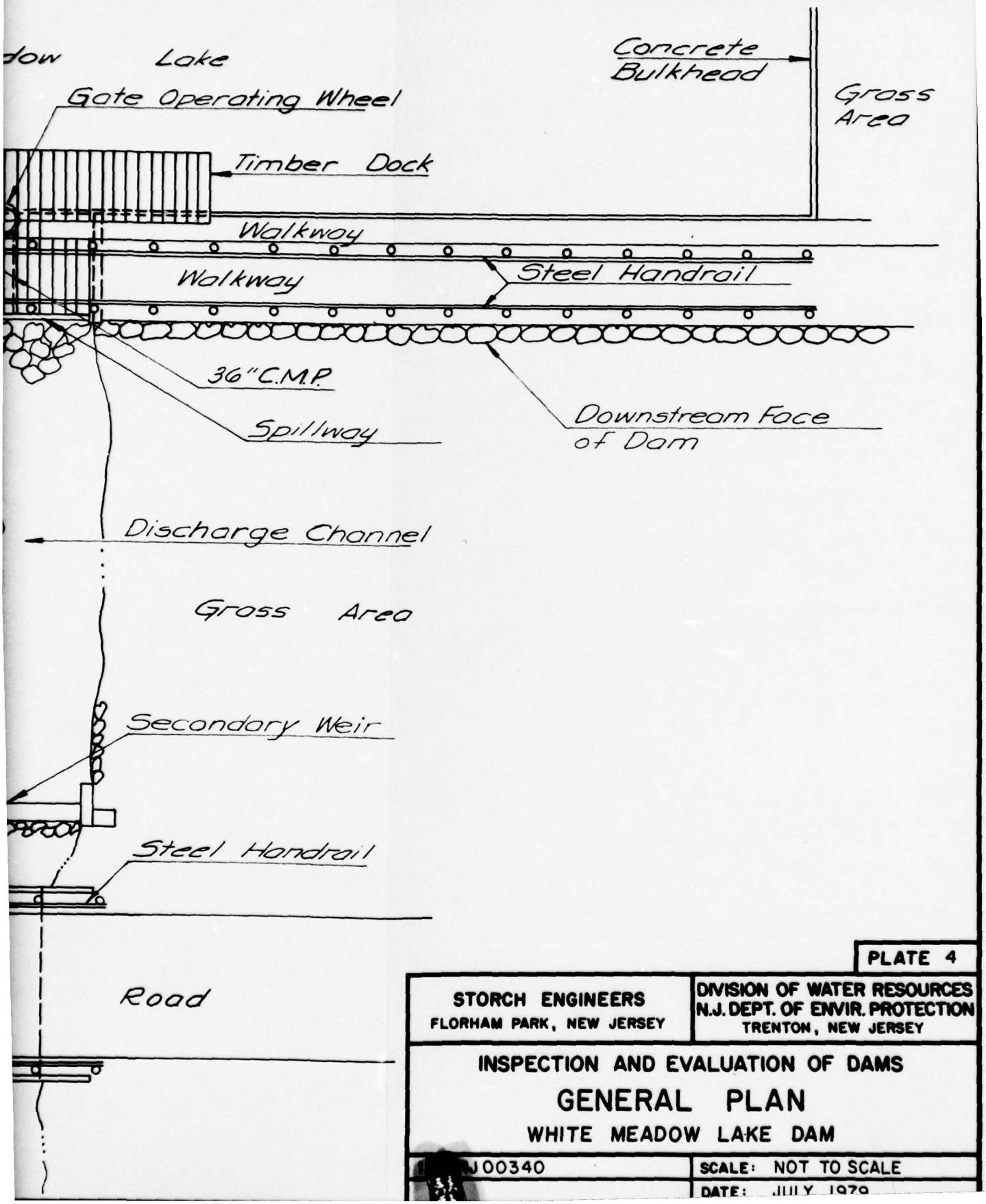


PLATE 4

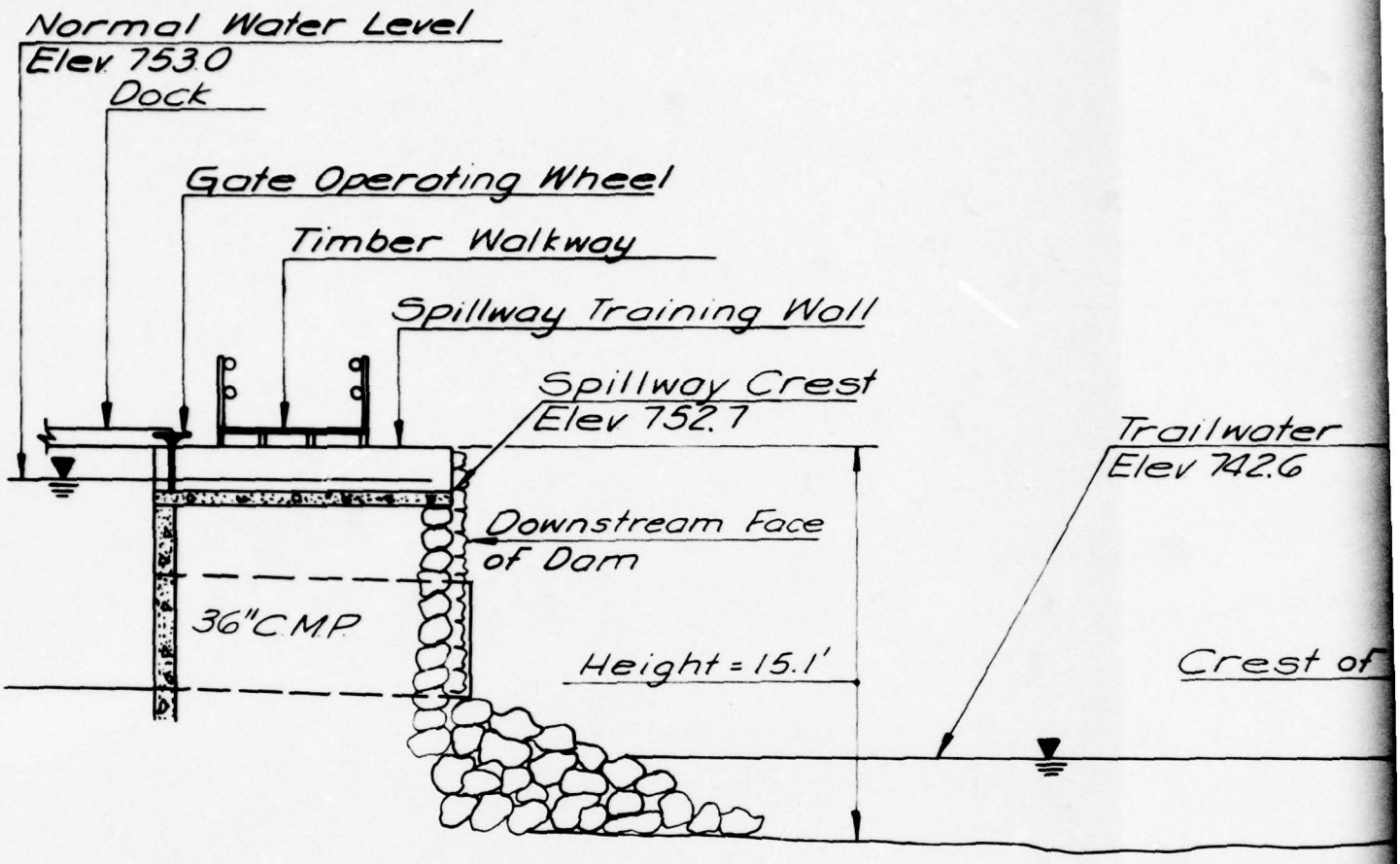
STORCH ENGINEERS FLORHAM PARK, NEW JERSEY	DIVISION OF WATER RESOURCES N.J. DEPT. OF ENVIR. PROTECTION TRENTON, NEW JERSEY

INSPECTION AND EVALUATION OF DAMS

GENERAL PLAN

WHITE MEADOW LAKE DAM

NJ00340	SCALE: NOT TO SCALE
	DATE: JULY 1979



Note: Information taken from field inspection April 30, 1979.

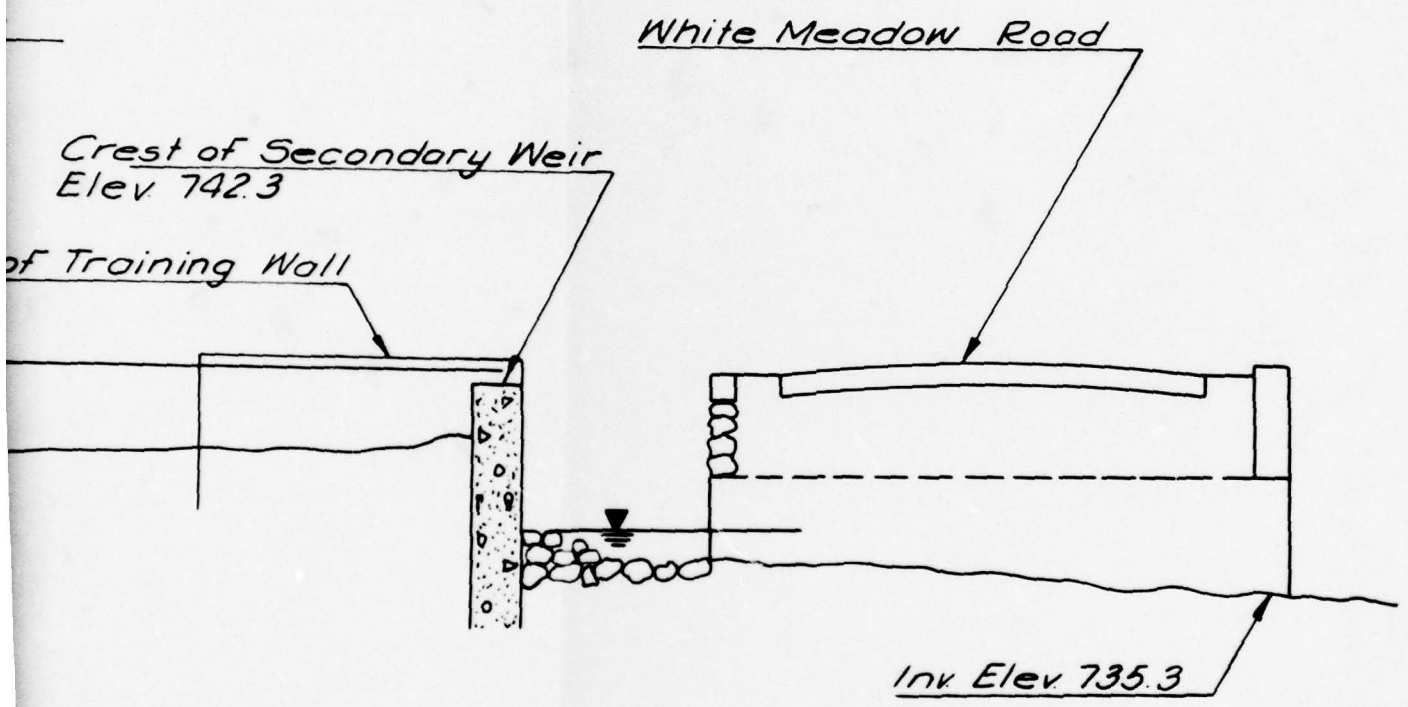


PLATE 5

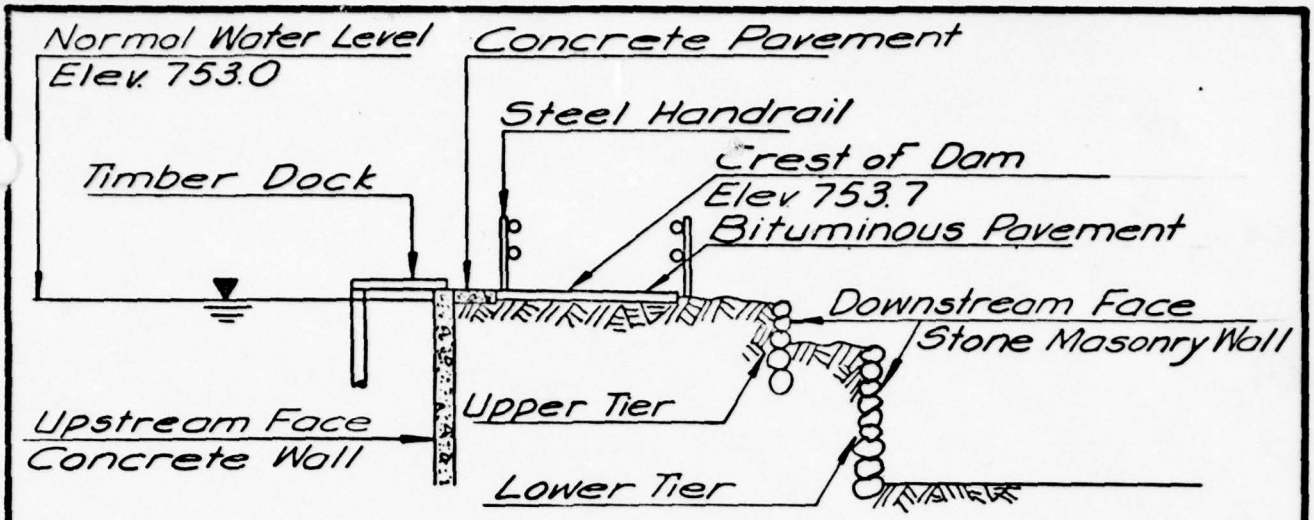
STORCH ENGINEERS FLORHAM PARK, NEW JERSEY	DIVISION OF WATER RESOURCES N.J. DEPT. OF ENVIR. PROTECTION TRENTON, NEW JERSEY

INSPECTION AND EVALUATION OF DAMS

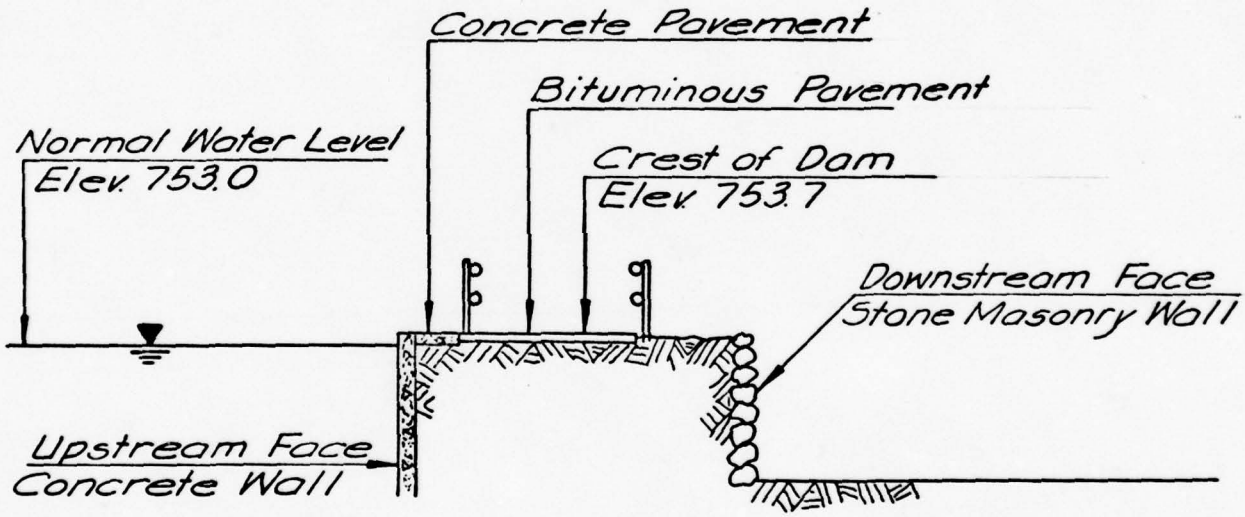
SPILLWAY SECTION

WHITE MEADOW LAKE DAM

I.D. NJ00340	SCALE: NOT TO SCALE
	DATE: JULY, 1979



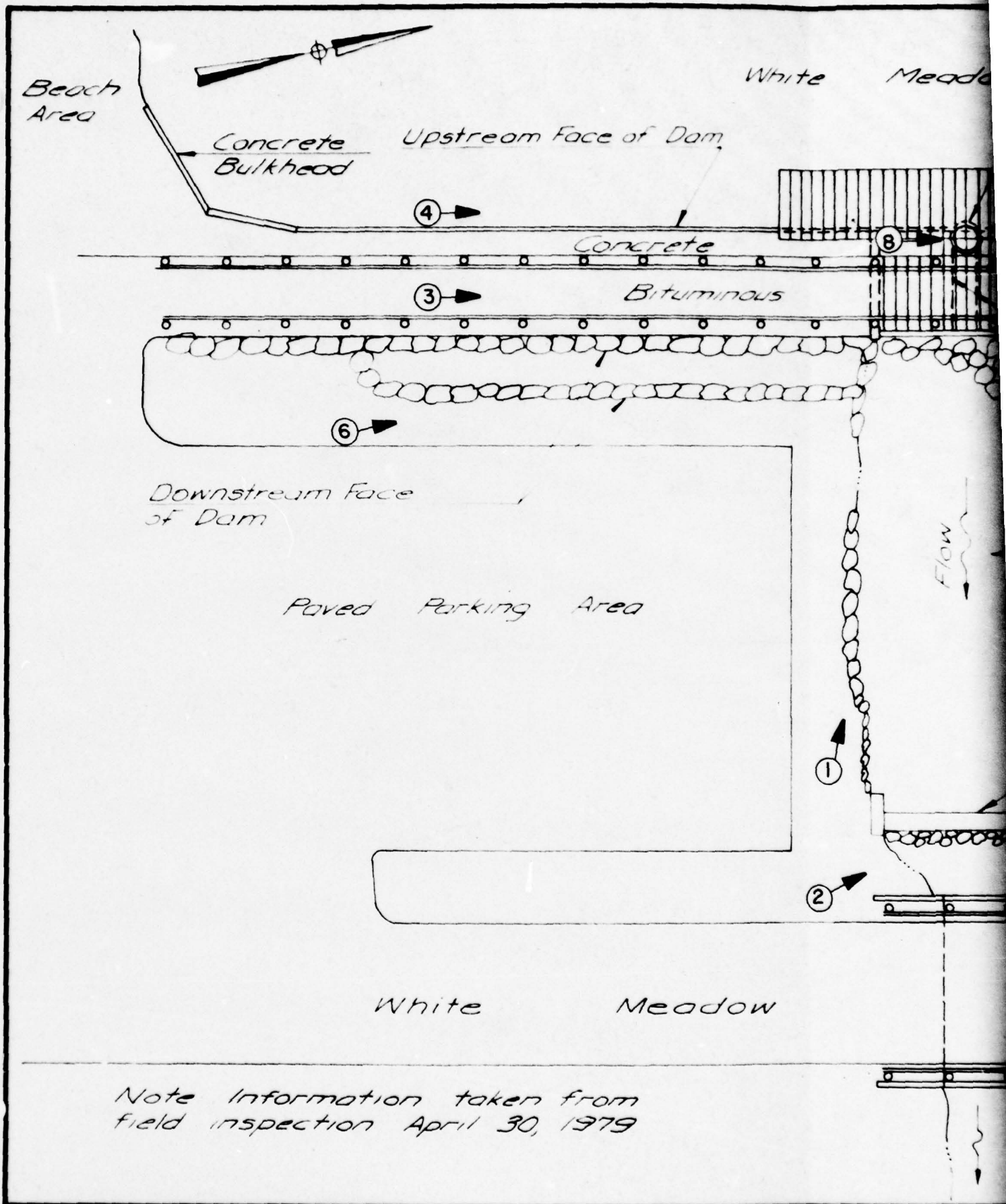
DAM SECTION
(South of Spillway)



DAM SECTION
(North of Spillway)

PLATE 6

STORCH ENGINEERS FLORHAM PARK, NEW JERSEY	INSPECTION AND EVALUATION OF DAMS DAM SECTIONS WHITE MEADOW LAKE DAM
DIVISION OF WATER RESOURCES N.J. DEPT. OF ENVIR. PROTECTION TRENTON, NEW JERSEY	I.D. NJ00340 — SCALE: NOT TO SCALE DATE: JULY, 1979



Note Information taken from field inspection April 30, 1979

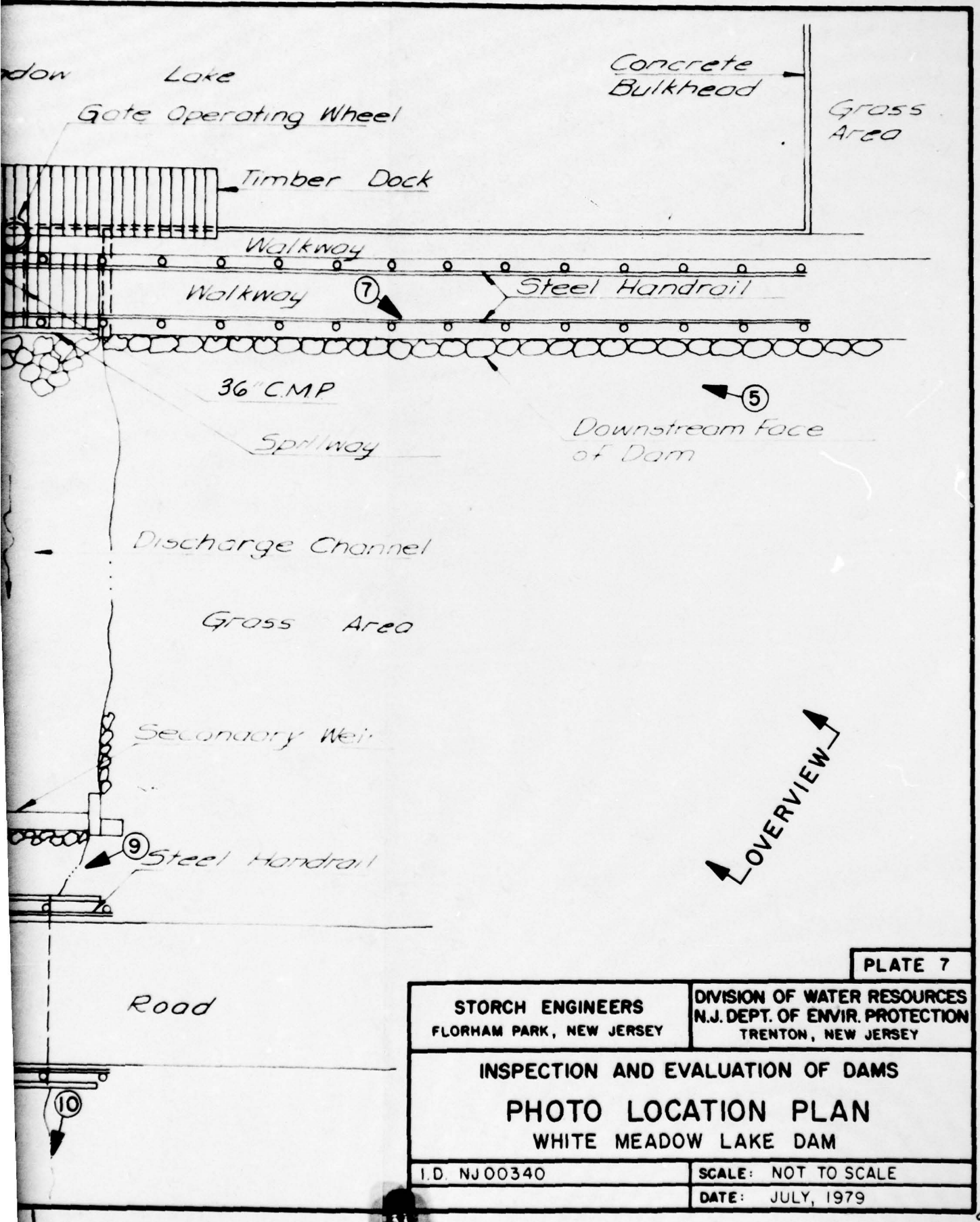


PLATE 7

STORCH ENGINEERS FLORHAM PARK, NEW JERSEY	DIVISION OF WATER RESOURCES N.J. DEPT. OF ENVIR. PROTECTION TRENTON, NEW JERSEY

INSPECTION AND EVALUATION OF DAMS

PHOTO LOCATION PLAN

WHITE MEADOW LAKE DAM

I.D. NJ00340	SCALE: NOT TO SCALE
	DATE: JULY, 1979

2

APPENDIX 1

Check List - Visual Inspection

Check List - Engineering Data

Check List
Visual Inspection
Phase I

Name of Dam White Meadow Lake County Morris State New Jersey Coordinators NJDEP

Date(s) Inspection 4/30/79 Weather Fair Temperature 75°F

Pool Elevation at Time of Inspection 753.0 M.S.L. Tailwater at Time of Inspection 742.6 M.S.L.

Inspection Personnel:

John Gribbin David Hoyt

Ronald Lai Joseph Fox

Richard McDermott

John Gribbin Recorder

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
GENERAL	N.A.	
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	N.A.	
DRAINS	N.A.	
WATER PASSAGES	N.A.	
FOUNDATION	N.A.	
VERTICAL AND HORIZONTAL ALIGNMENT	N.A.	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	N.A.	
STRUCTURAL CRACKING	N.A.	
CONSTRUCTION JOINTS	N.A.	
MONOLITH JOINTS	N.A.	
LEAKAGE	N.A.	
SEEPAGE	N.A.	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
GENERAL	Crest of dam, adjacent to paved walkway, planted with shrubs and ground cover. Also, trees present on crest and on lower tier along south section.	
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Junctions between embankment and spillway abutments appear to be in satisfactory condition.	
ANY NOTICEABLE SEEPAGE	Two seepage zones observed. 1. Seepage observed as wet area at toe of wall 36' south of spillway. 2. Possible seepage observed as discharge at toe of wall approx. 2' south of spillway.	
UPSTREAM FACE	Due to water level, only the top of wall was observed. Concrete appeared to be in satisfactory condition. South section appeared to have been repaired by a shotcrete-type process. Construction joint between wall and concrete sidewalk generally in satisfactory condition with some separation noted along the south section.	Upstream face of dam consists of vertical concrete wall.
DOWNSTREAM FACE	Wall along north section generally in satisfactory condition. Portion of lower tier of south section tilted in downstream direction. Upper tier in generally satisfactory condition.	Downstream face of dam consists of vertical stone wall along north section and two-tiered stone masonry wall along south section.

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	Several longitudinal cracks observed in bituminous pavement on crest approx. 1' to 2' from downstream face.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	Generally, none apparent. Portion of stone masonry wall along south section of downstream face is tilted.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Bituminous pavement failed in one small area near downstream side of crest. (Failure resembles "pothole".)	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Vertical: level Horizontal: straight	
RIPRAP FAILURES	N.A.	

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SURFACES IN OUTLET CONDUIT	N.A.	
INTAKE STRUCTURE	Submerged	
OUTLET STRUCTURE	Corrugated metal pipe outletting at spillway was obscured by discharge over spillway. The pipe appeared to be in a generally deteriorated condition.	Recommend inspection with lake drawn down.
OUTLET CHANNEL		Same as discharge channel for spillway.
GATE AND GATE HOUSING	Gate could not be observed. Gate operating wheel appeared to be in adequate condition.	Gate was not operated at the time of inspection.

SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	Surface of crest appears level but concrete is eroded with aggregate exposed.	Surface obscured by discharge and timber walkway.
APPROACH CHANNEL	Bottom formed by concrete slab across crest of dam. Sides formed by spillway abutments. Condition appeared satisfactory but channel obscured by discharge and by walkway.	
DISCHARGE CHANNEL	Earth channel conveys discharge approx. 80 ft. downstream to secondary concrete weir immediately upstream from secondary road. Discharge from secondary weir flows under road via concrete bridge in generally good condition.	
GENERAL	Concrete abutments appeared to be in good condition.	
WALKWAY	Timber walkway spans spillway approach channel. Walkway appeared to be in satisfactory condition with paint partially worn.	Timber swimming dock is located along upstream side of dam in vicinity of spillway.

INSTRUMENTATION

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None	
OBSERVATION WELLS	None	
WEIRS	None	
PIEZOMETERS	None	
OTHER	N.A.	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Shore slopes range from 5% to 20% with an average of approx. 8%.	
SEDIMENTATION	Unknown.	
STRUCTURES ALONG BANKS	Homesites are located along most of shoreline. Docks and other lake related structures are present at some of the homesites.	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Well defined stream with no significant obstructions observed. Land along most of the length of the stream consists of the back yards of homes.	
SLOPES	Bank slopes range from 5% to 20%.	
STRUCTURES ALONG BANKS	Approx. twelve homes located along downstream channel within 1000' of the dam.	

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

ITEM	REMARKS
DAM - PLAN	Not Available
SECTIONS	Not Available
SPILLWAY - PLAN	Not Available
SECTIONS	Not Available
DETAILS	Not Available
OPERATING EQUIPMENT PLANS & DETAILS	Not Available
OUTLETS - PLAN	Not Available
DETAILS	Not Available
CONSTRAINTS	Not Available
DISCHARGE RATINGS	Not Available
HYDRAULIC/HYDROLOGIC DATA	Not Available
RAINFALL/RESERVOIR RECORDS	Not Available
CONSTRUCTION HISTORY	Not Available
LOCATION MAP	Available

ITEM	REMARKS
DESIGN REPORTS	Not Available
GEOLOGY REPORTS	Not Available
DESIGN COMPUTATIONS	
HYDROLOGY & HYDRAULICS	Not Available
DAM STABILITY	Not Available
SEEPAGE STUDIES	Not Available
MATERIALS INVESTIGATIONS	
BORING RECORDS	Not Available
LABORATORY	
FIELD	
POST-CONSTRUCTION SURVEYS OF DAM	Not Available
BORROW SOURCES	Not Available

ITEM	REMARKS
MONITORING SYSTEMS	Not Available
MODIFICATIONS	Not Available
HIGH POOL RECORDS	Not Available
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	Not Available
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	Not Available
MAINTENANCE OPERATION RECORDS	Not Available

APPENDIX 2

Photographs

PHOTO 1

SPILLWAY

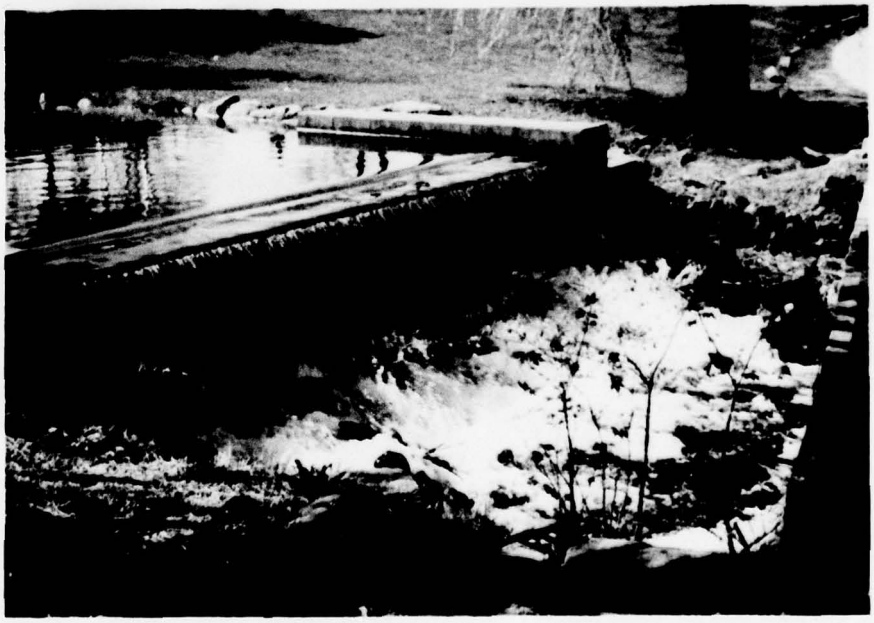


PHOTO 2

SPILLOVER AT DOWNSTREAM END OF SPILLWAY DISCHARGE CHANNEL

WHITE MEADOW LAKE DAM
30 APRIL 1979

PHOTO 3

CREST OF DAM

PHOTO 4

UPSTREAM FACE OF DAM

WHITE MEADOW LAKE DAM
30 APRIL 1979

PHOTO 5

DOWNSTREAM FACE OF NORTH SECTION OF DAM

PHOTO 6

DOWNSTREAM FACE OF SOUTH SECTION OF DAM

WHITE MEADOW LAKE DAM
30 APRIL 1979

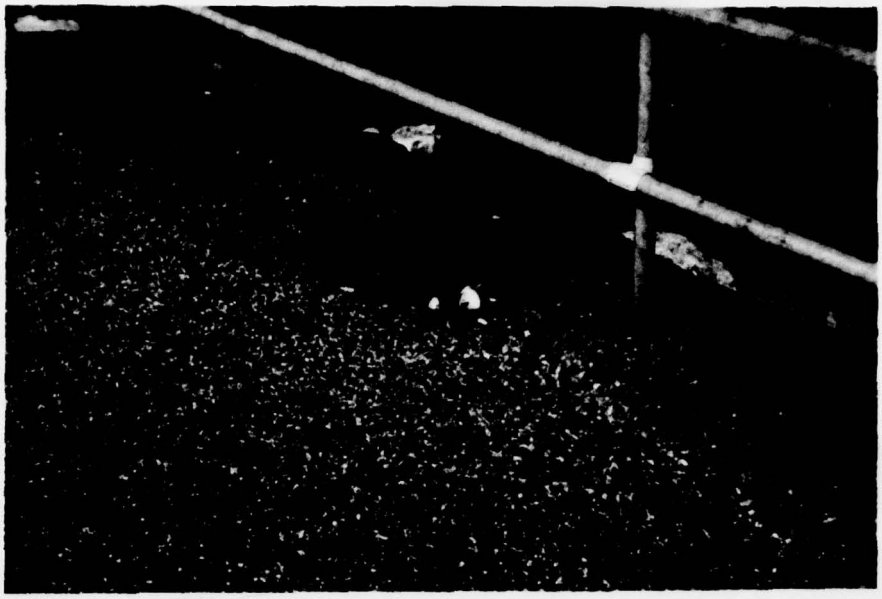


PHOTO 7

PAVEMENT FAILURE ON DAM CREST

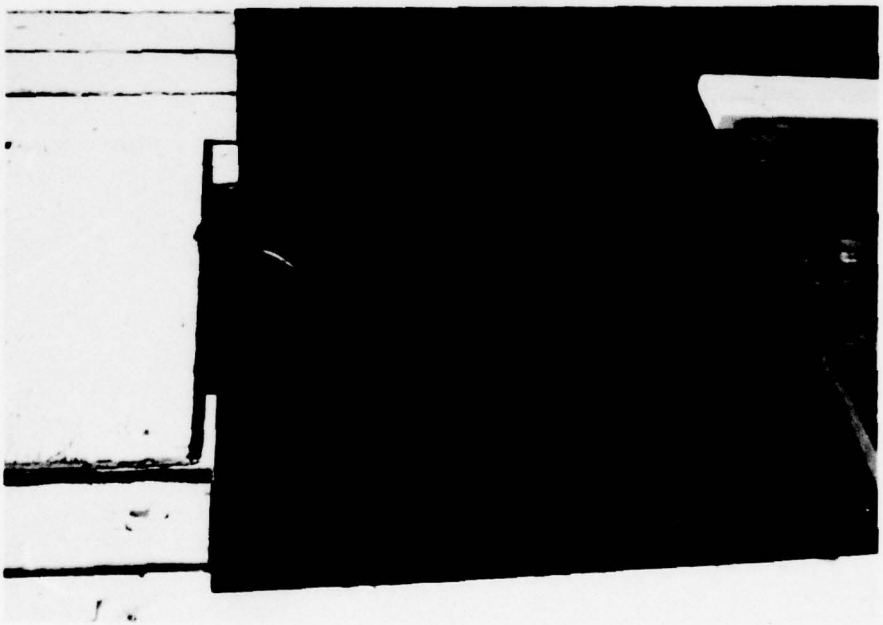


PHOTO 8

OUTLET WORKS OPERATING MECHANISM

WHITE MEADOW LAKE DAM
30 APRIL 1979

PHOTO 9

BRIDGE DOWNSTREAM FROM DAM

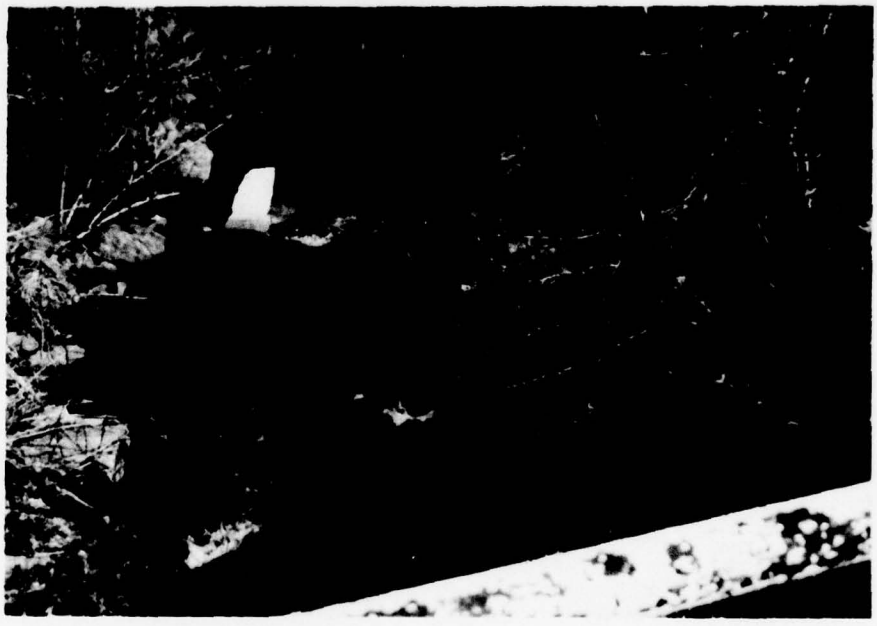


PHOTO 10

DOWNSTREAM CHANNEL

WHITE MEADOW LAKE DAM
30 APRIL 1979

APPENDIX 3

Engineering Data

CHECK LIST

HYDROLOGIC AND HYDRAULIC DATA

ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: Mainly wooded

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 753.0 (320 acre-feet)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): N.A.

ELEVATION MAXIMUM DESIGN POOL: 755.1

ELEVATION TOP DAM: 753.7

SPILLWAY CREST: Concrete Weir

a. Elevation 752.7
b. Type Uncontrolled Weir
c. Width 20 feet
d. Length 29 feet
e. Location Spillover Downstream side of dam
f. Number and Type of Gates N.A.

OUTLET WORKS: Gated Pipe

a. Type 36" corrugated metal pipe with lift gate
b. Location At center of spillway
c. Entrance inverts Unknown
d. Exit inverts 744.9
e. Emergency draindown facilities: Open gate

HYDROMETEOROLOGICAL GAGES: None

a. Type N.A.
b. Location N.A.
c. Records N.A.

MAXIMUM NON-DAMAGING DISCHARGE:

(Lake stage equal to top of dam) 76 c.f.s.

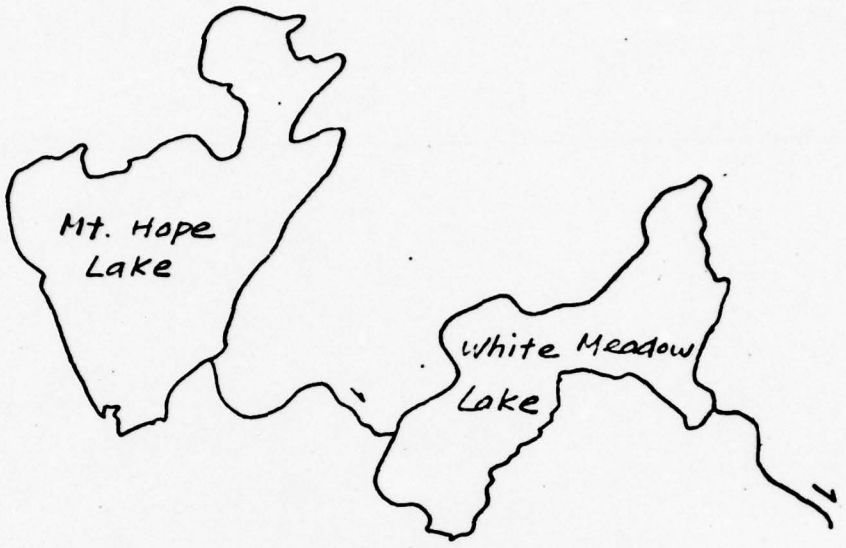
APPENDIX 4

Hydrologic Computations

STORCH ENGINEERS Sheet ____ of ____

Project Mt Hope Lake/ White Meadow Lake Made By RL Date 6-27-79

Chkd By ____ Date ____



Mt. Hope Lake is directly upstream of white Meadow Lake. The inflow hydrograph to white Meadow Lake Dam is the sum of outflows from Mt. Hope Lake and runoff from white Meadow Lake watershed area under the SDF of 0.5 PMF conditions.

Enclosed calculation :

Part A : H/H calculation for Mt Hope Lake

Part B : H/H calculation for white Meadow Lake.

Part C : Breach Analysis

Part A

Hydrologic Analysis

Runoff hydrograph by HEC-1-DB using SCS UHG and routed by the Modified Puls method. Drainage Area = 1.9 Sq. mile

Infiltration Data

Drainge area is mainly wooded

use initial infiltration 1.5 in

constant infiltration 0.15 in/hr.

Time of Concentration By SCS TR-55

Length of overland flow = 1700 ft.
Slope = 0.12
Vel of travel = 0.9 ft/sec

Length of channel flow = 2200
Slope = 0.03
Vel of travel = 2.5 ft/sec

$$Tc = \left(\frac{1700}{0.9} + \frac{2200}{2.5}\right) \times \frac{1}{3600} = 0.77 \text{ hr.}$$

Time of concentration by "Design of Small Dam" SCS Nomograph Pg 71

$H = 240'$

$L = 3900'$

$T_c = 0.21$ hr.

Time of concentration by Kerby Pg 14-36 "Handbook of Applied Hydrology" by Chow

$$t_c^{2.14} = \frac{2}{3} \frac{Ln}{\sqrt{S}}$$

t_c = time of concentration in min
L = length of overland flow in ft
S = slope
n = 0.4 Roughness Coef.

$$t_c^{2.14} = \frac{2}{3} \frac{1700 \times 0.4}{\sqrt{0.12}}$$

$t_c = 28.6$ min $= 0.48$ hr.

t_c for channel flow 0.24 hr. from previous page

$T_c = 0.48 + 0.24 = \underline{0.72}$ hr.

For HEC - 1 input

Use T_C = 0.7 hr.

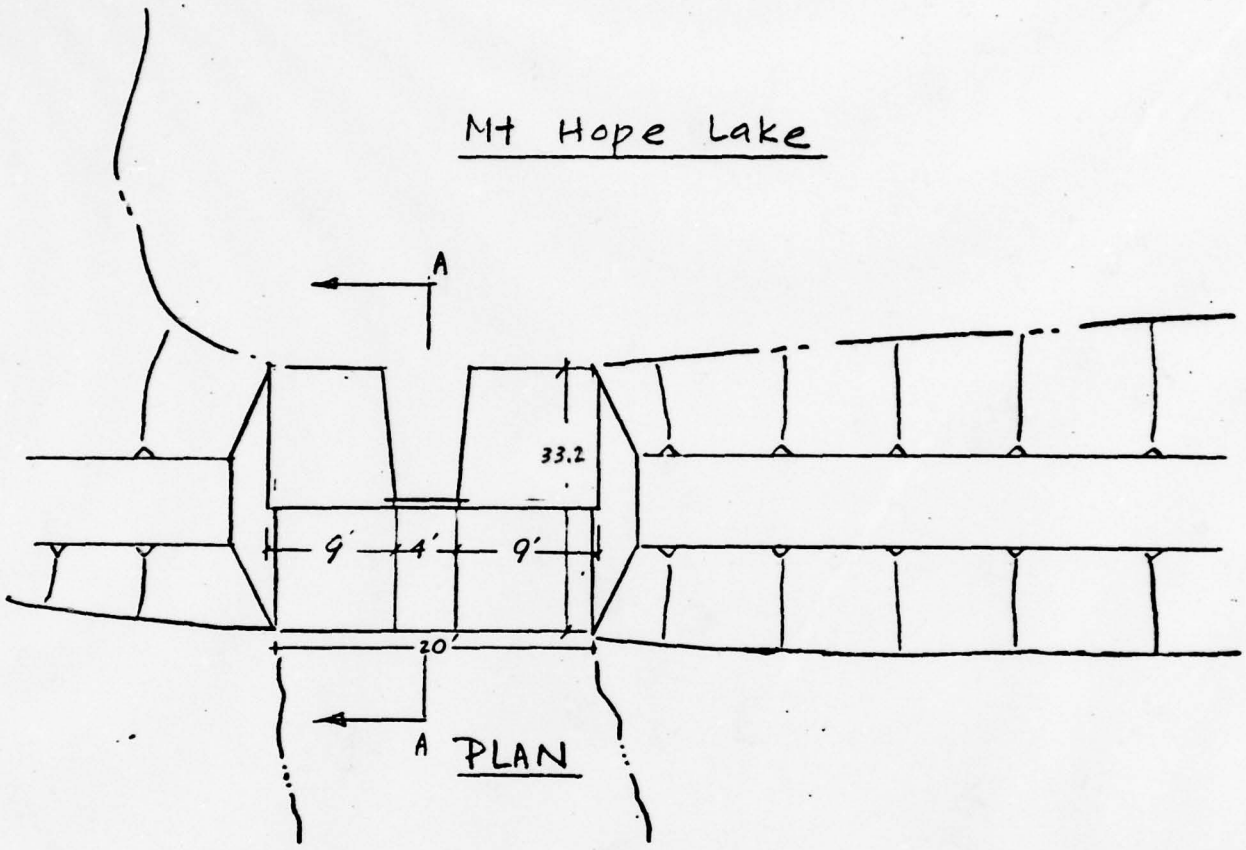
Lag = 0.7 × 0.6 = 0.42 hr.

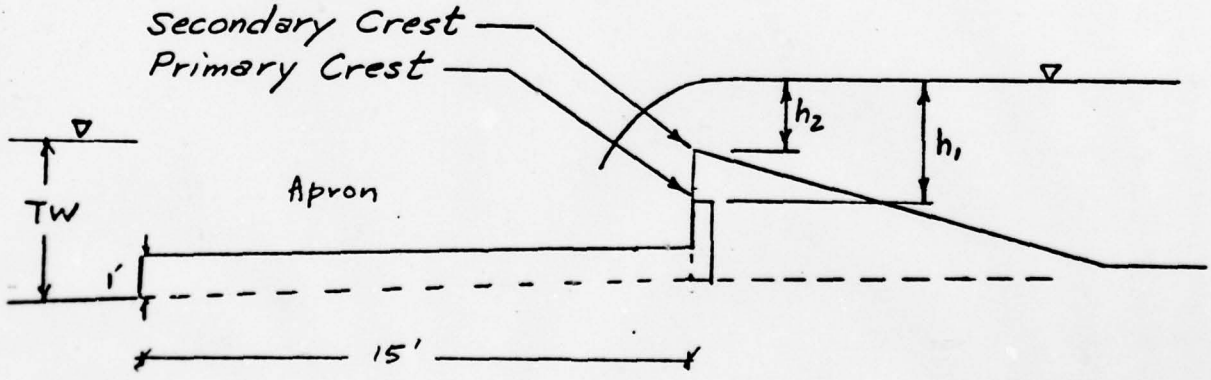
Lake Storage Volume

Information from USGS & Aerial Photos

Elev (M.S.L.)	Surface Area (Ac.)
797	190
800	294
820	420

HEC - 1 - DB program will develope storage capacity from surface area and elev.





SPILLWAY SECTION A A

SPILLWAY DISCHARGE

Spillway discharge flows over weirs at two levels with effective lengths L_1 and L_2 respectively. L_1 is a broad-crest weir and L_2 is a sharp crest weir with triangular section.

Discharge Q can be calculated by the following formula:

$$Q = CLh^{3/2}$$

C for primary crest use 3.1

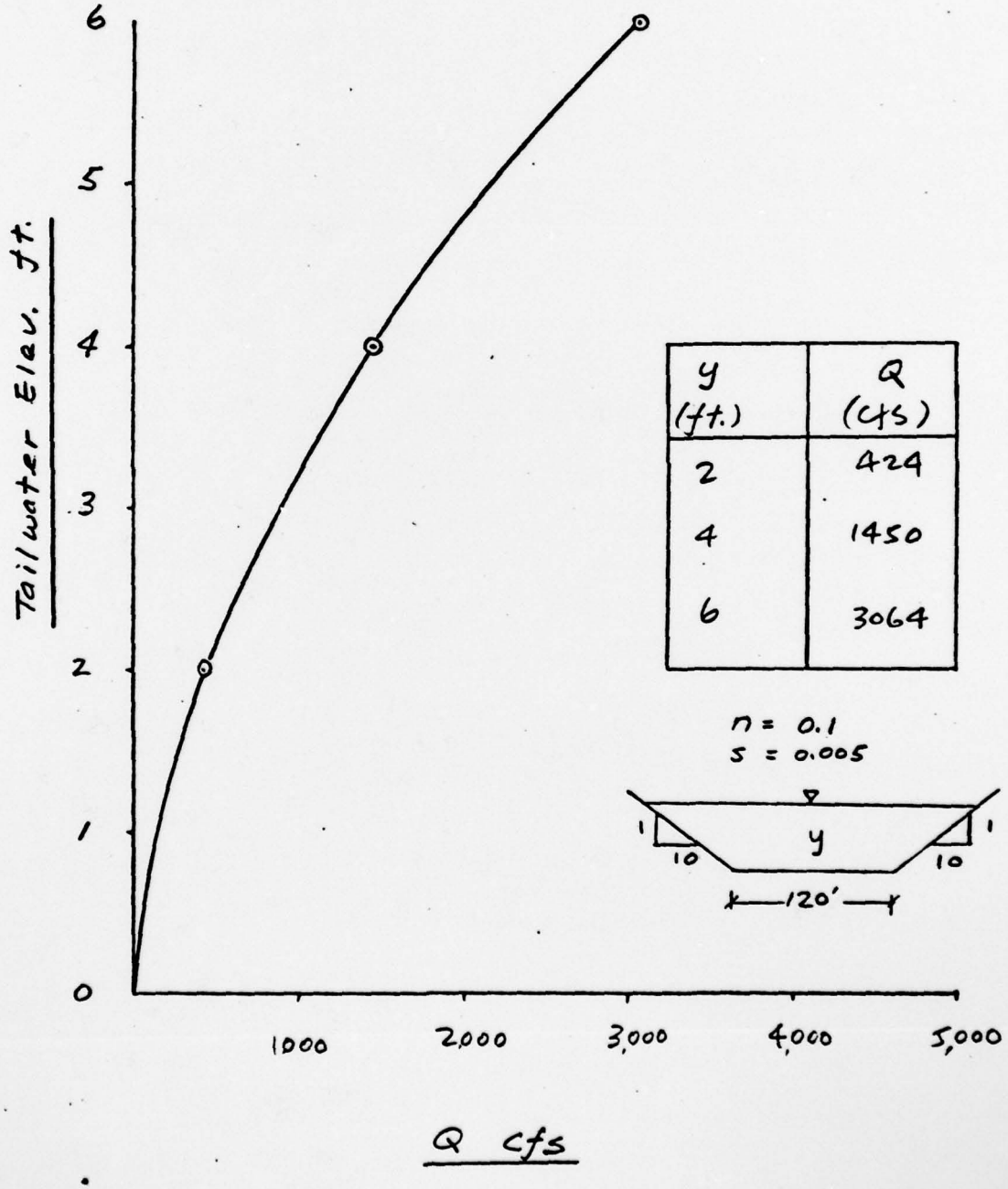
C for secondary crest 3.6

Since weir is low and downstream channel is shallow, the effect of tailwater is significant. A rough estiimate of tailwater elevation is shown on the following page.

These estimates are obtained by using a section 100' downstream and Mannings equation.

Downstream Channel Tailwater

Stage Discharge Curve



y (ft.)	Q (cfs)
2	424
4	1450
6	3064

n = 0.1
s = 0.005

Stage Discharge Tabulation

W.L. (ft)	h_1	h_2	Q_1 (cfs)	Q_2	Tailwater elev. (ft)	C adj. factor	ΣQ (cfs)
796.5	0	0	0	0	-	-	0
797.0	0.5	0	4	0	-	-	4
799.0	2.5	2.0	49	183	1.3	-	232
801.0	4.5	4.0	118	518	2.3	-	636
802.0	5.5	5.0	160	724	2.6	0.97	858
803.0	6.5	6.0	206	952	3.1	0.96	1,112
804.0	7.5	7.0	255	1200	3.9	0.95	1,382
805.0	8.5	8.0	307	1466	4.5	0.93	1,649

Note: Adjustment factor applied when weir is submerged.
Ref. 5-18 Handbook of Hydraulics King et al.

STORCH ENGINEERS

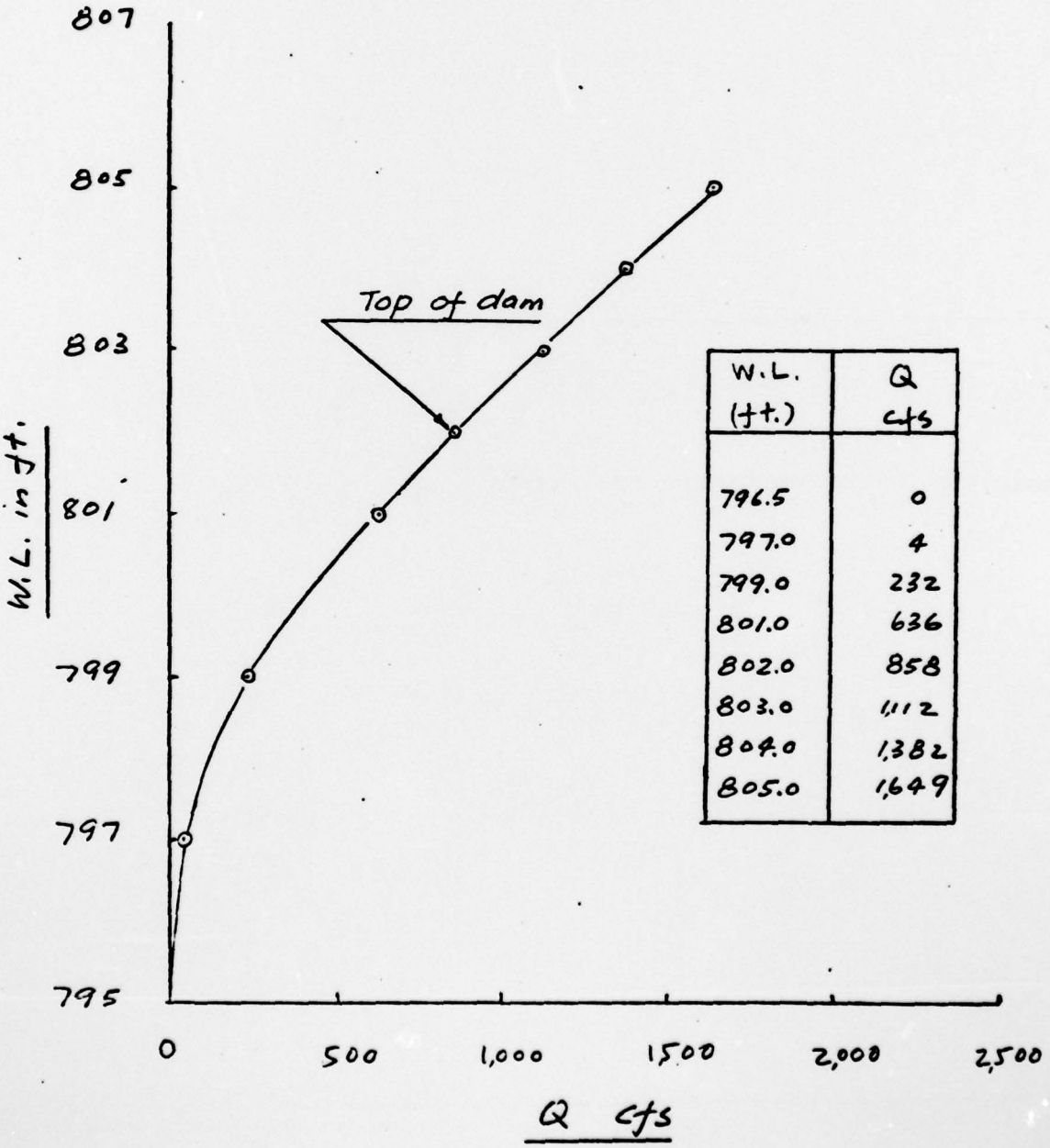
Sheet 8 of 8

Project Mt Hope Lake Dam

Made By RL Date 5-18-79

Chkd By DHF Date 6/5/79

Stage Discharge Curve for Spillway



W.L. (ft.)	Q cfs
796.5	0
797.0	4
799.0	232
801.0	636
802.0	858
803.0	1,112
804.0	1,382
805.0	1,649

Part B

Hydrologic Analysis

Runoff hydrograph of White Meadow Lake will be combined with outflow hydrograph of Mt. Hope Lake and then routed through White Meadow Lake Dam.

Infiltration Data

Drainage area is mostly wooded.
use 1.5 in initial and 0.15 in/hr.
Constant infiltration.

Time of concentration TR-55 SCS

(For White Meadow Lake area)

Length of overland flow = 3,000 ft
Slope = 5.6 %
vel. of travel = 0.6 ft/sec

$$Tc = \frac{3000}{0.6} \times \frac{1}{3600} = 1.38 \text{ hr.}$$

Time of Concentration by "Design of Small Dams"

SCS Nomograph
Pg 71

H = 170'

L = 3000'

Tc = 0.19 hr.

Time of Concentration by Kerby

Pg 14-36
"Handbook of Applied Hydrology" by Chow

$$t_c^{2.14} = \frac{2}{3} \frac{L\eta}{\sqrt{S}}$$

t_c = time of concentration in min.
L = length of overland flow in ft.
S = Slope
η = 0.8 Roughness coef. dense grass

$$t_c^{2.14} = \frac{2}{3} \frac{3000\,(0.8)}{\sqrt{0.056}}$$

t_c = 62 min = 1.03 hr.

Use T_c = 1.1 hr.

Lag = 0.6 (1.1) = 0.66 hr.

Lake storage volume

Information from USGS Maps & Aerial photos

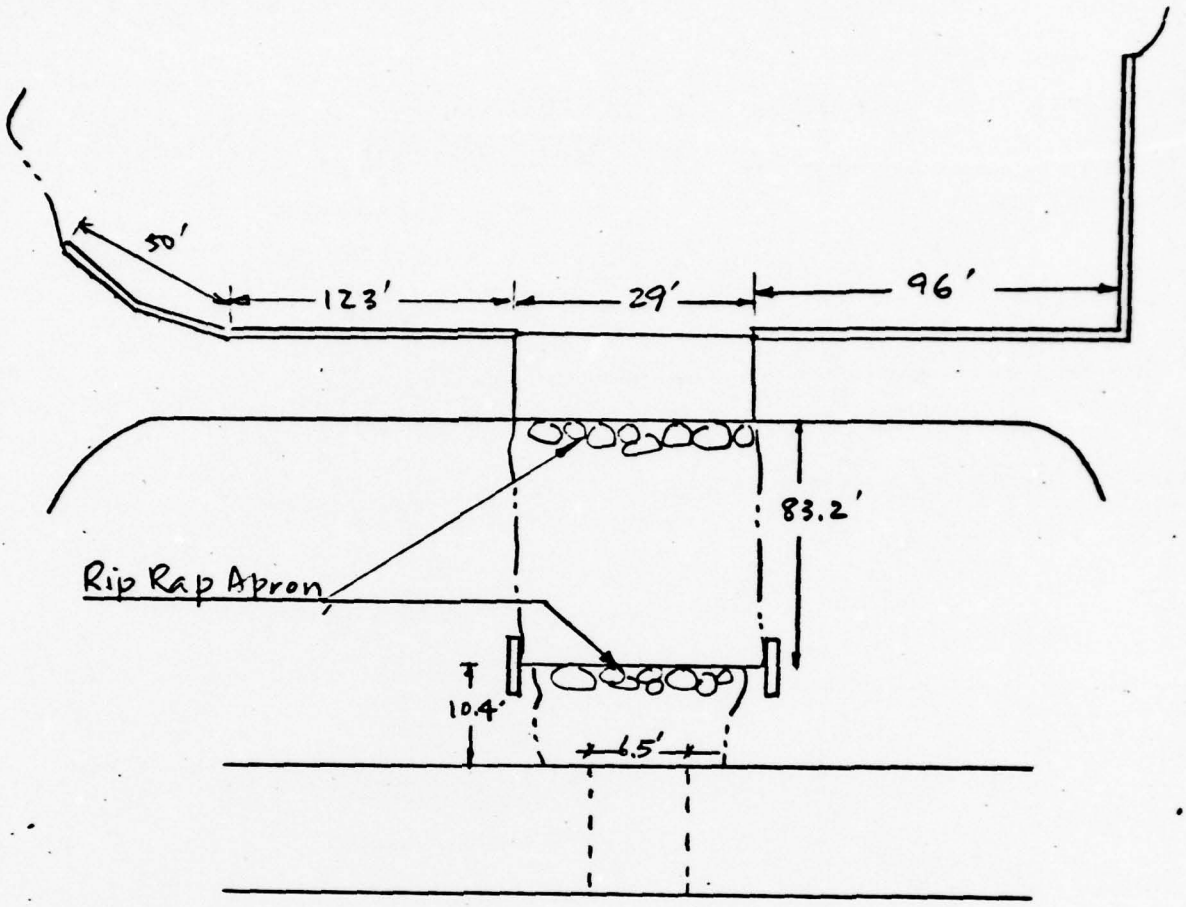
Elev. (M.S.L)	Surface Area (Ac)
745	0
753	137
766	184

HEC-1-DB program will develope storage capacity from surface area and elev.

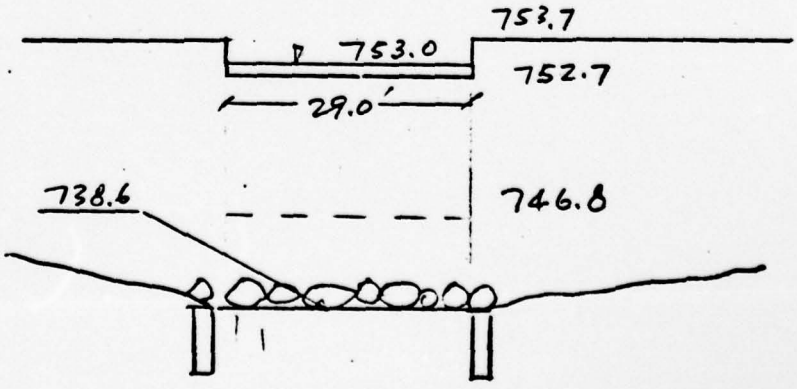
STORCH ENGINEERS Sheet 4 of 8

Project White Meadow Lake Dam Made By RL Date 6-18-79

Chkd By DMF Date 6-26-79



Plan of Spillway



Front Elevations

Spillway Discharge

Spillway is a concrete broad crested weir with effective length 29'.

Discharge Q can be calculated by

$$Q = CLh^{3/2}$$

$C = 2.63$

Tailwater has no effect on spillway discharge.

Stage Discharge Tabulation

W.L. (ft)	h (ft)	Q (cfs)
752.7	0	0
753.7	1	76
754.7	2	216
755.7	3	396
756.7	4	610
757.7	5	853

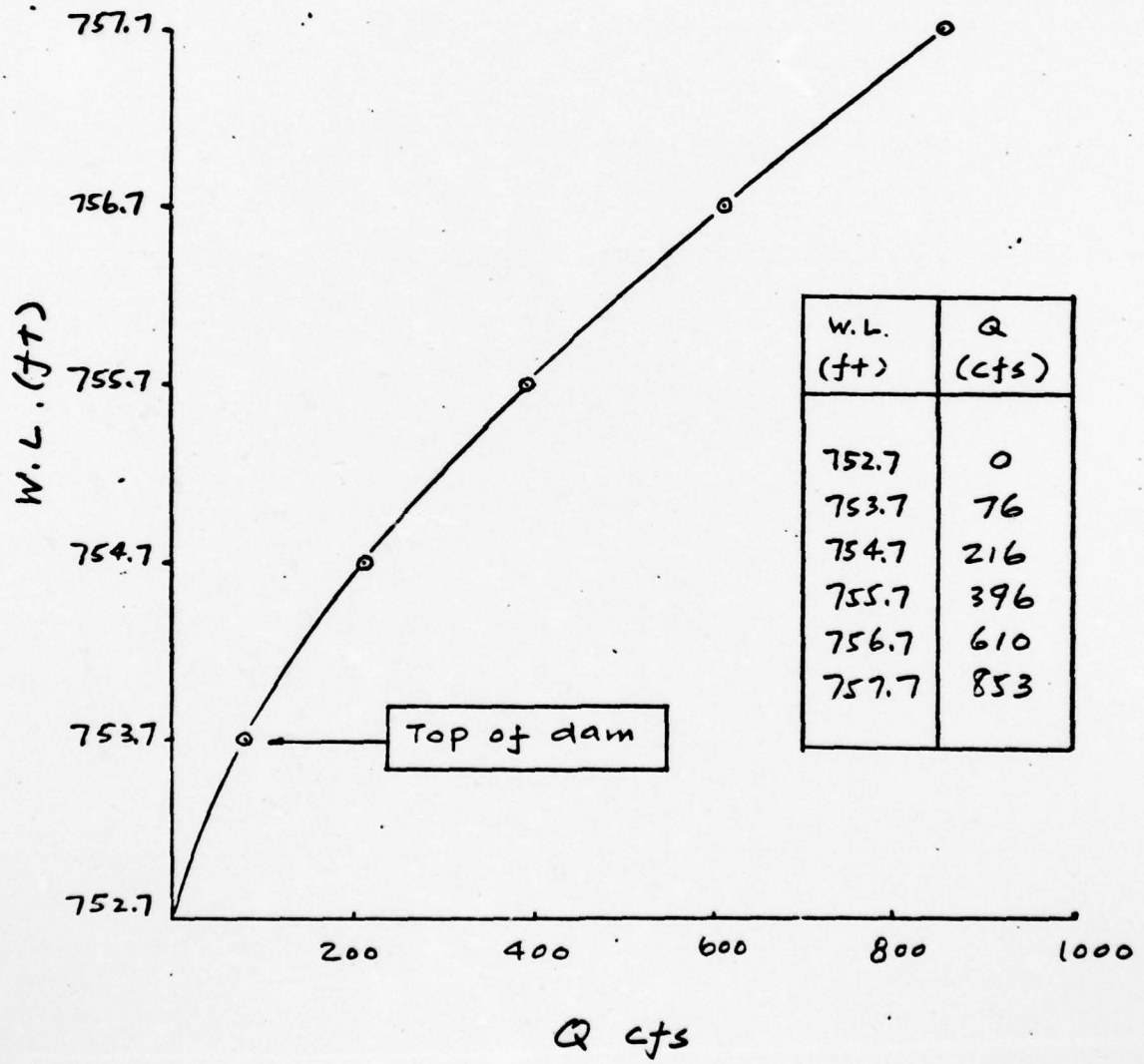
STORCH ENGINEERS

Sheet 6 of 8

Project White Meadow Lake Dam Made By RL Date 6-18-79

Chkd By DHF Date 6-26-79

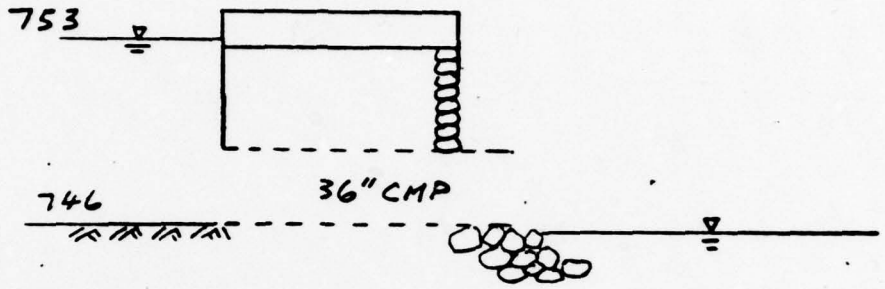
Spillway
Stage Discharge Curve



W.L. (ft)	Q (cfs)
752.7	0
753.7	76
754.7	216
755.7	396
756.7	610
757.7	853

Drawdown Calculation

Outlet Works Capacity at normal pool



Ref: "Hydraulic charts for The Selection of Highway Culverts"

Inlet control for 36" CMP
HW/D = 2.33 Q = 78 cfs

Drawdown Calculation

ELEV	(AC-ft) STORAGE	(AC-ft) Δ STORAGE	(ft) H	(cfs) Q	(cfs) Avg Q	AC-ft/day	days
755	—	—	—	—	—	—	—
753	320		7	78			
		206			69	137	1.5
751	114		5	60			
		88			47.5	94	0.9
749	26		3	35			
		25			22	44	0.7
747	1		1	9			
		1			4.5	9	0.1
746	0		0	0			
						Total	3.2

days

STORCH ENGINEERS

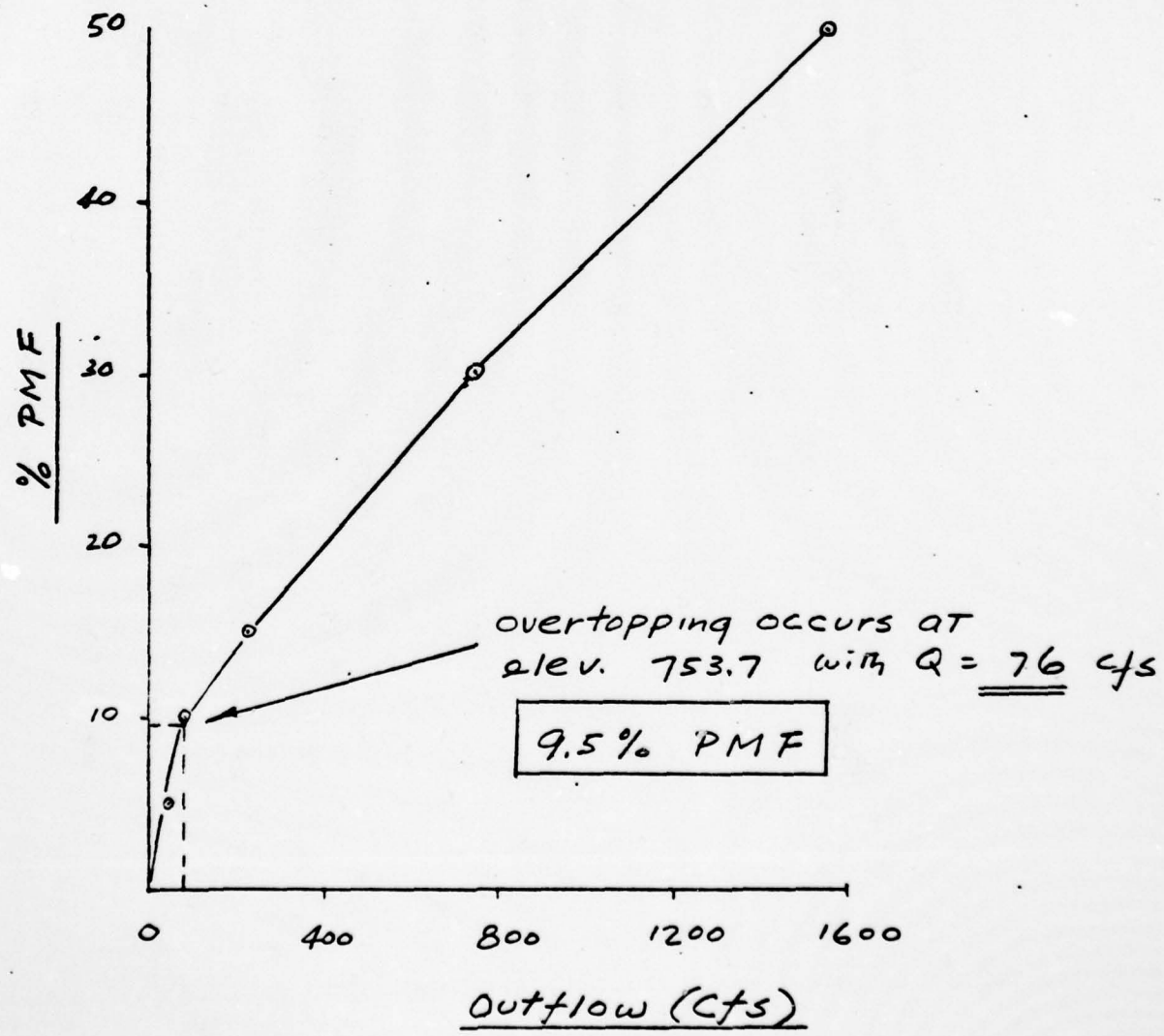
Sheet 8 of 8

Project White Meadow Lake

Made By RL Date 6-26-79

Chkd By DMP Date 6-26-79

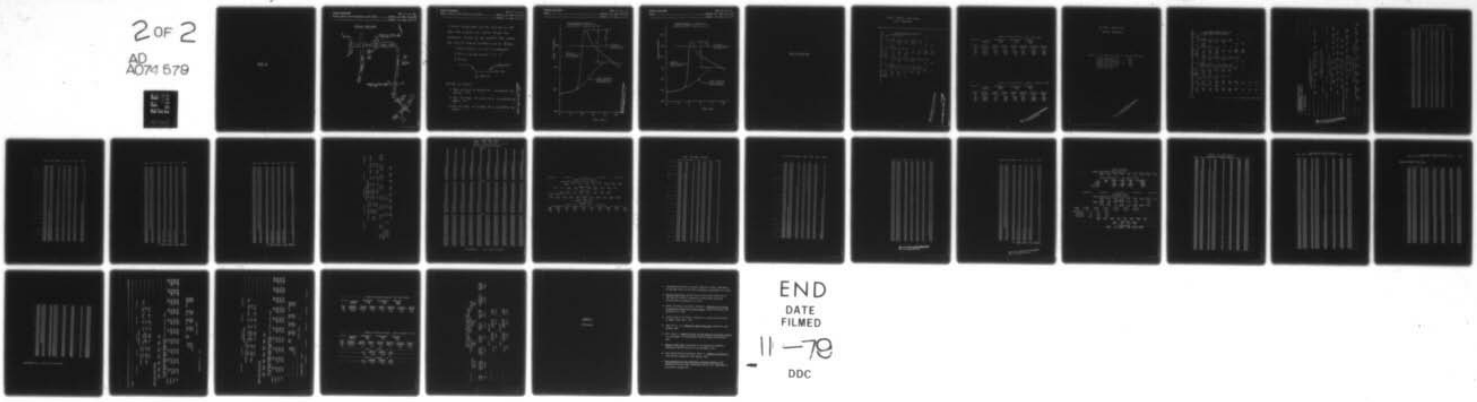
Overtopping Potential



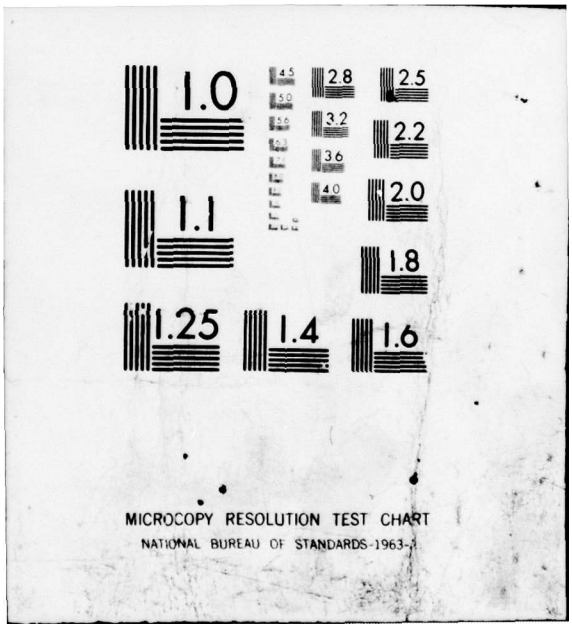
AD-A074 579 NEW JERSEY DEPT OF ENVIRONMENTAL PROTECTION TRENTON F/G 13/2
NATIONAL DAM SAFETY PROGRAM. WHITE MEADOW LAKE DAM (NJ-00340), --ETC(U)
AUG 79 R J MCDERMOTT, J E GRIBBIN DACW61-79-C-0011

UNCLASSIFIED NL

2 OF 2
AD
A074 579



END
DATE FILMED
11-79
DDC


1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0
5.6
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Part C

STORCH ENGINEERS

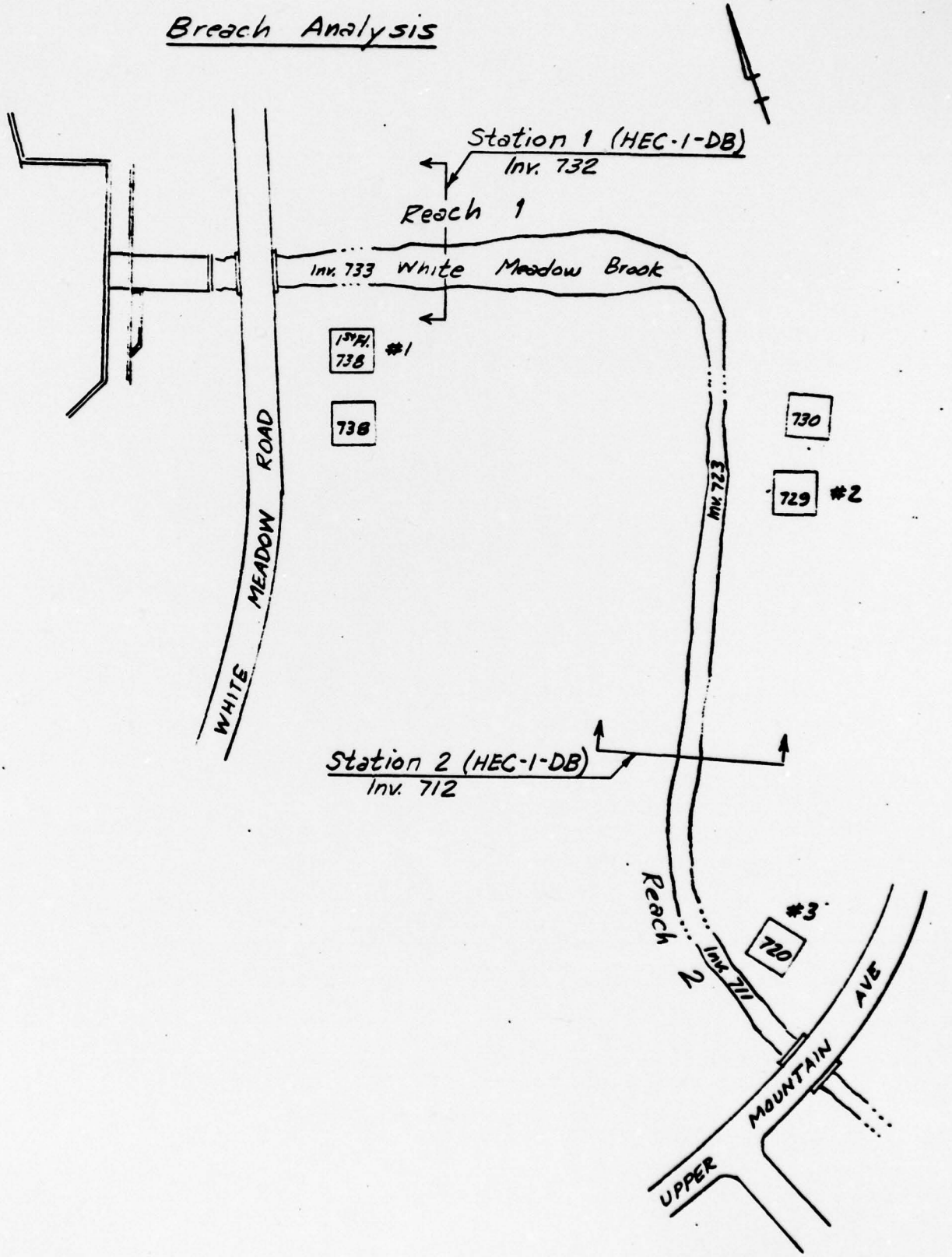
Sheet 1 of 4

Project 1132-B White Meadow Lake Dam

Made By JG Date 7-16-79

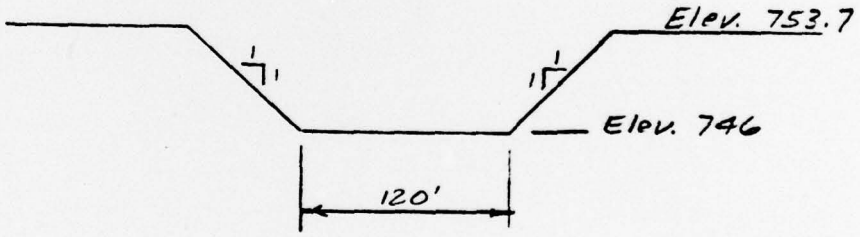
Chkd By RL Date 7-17-79

Breach Analysis



A breach hydrograph will be computed by the HEC-1-DB program and routed through two downstream reaches by the modified Puls method. The assumed breach conditions are as follows:

1. Breach begins when dam is overtopped.
2. Time to develop breach = 0.5 hr.
3. Section:



Results of Breach:

1. Two dwellings at location #1 inundated by approx. 1.5'.
2. Four dwellings at location #2 inundated by approx. 2'.
3. One dwelling at location #3 inundated by approx. 1'.

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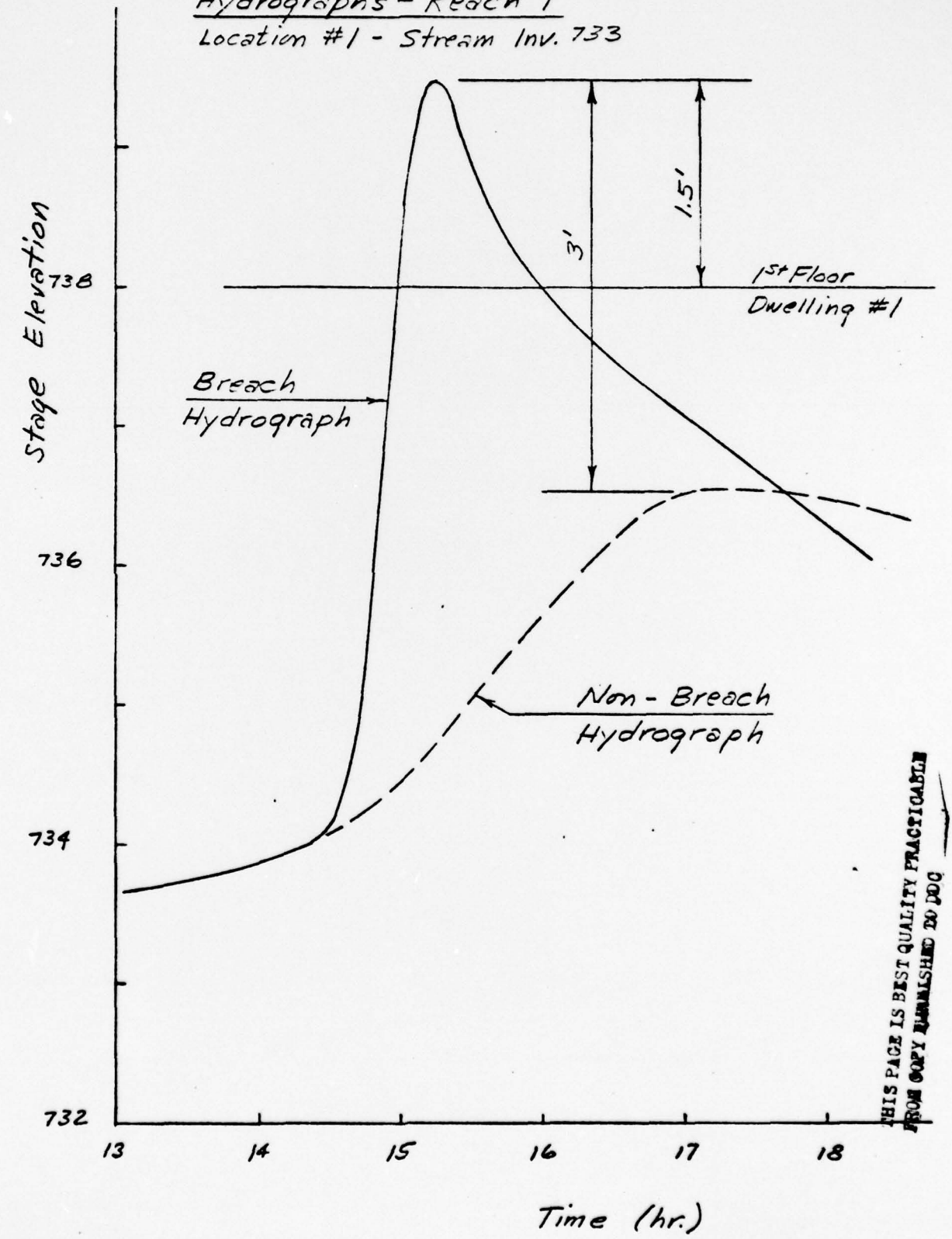
Hydrographs - Reach 1
Location #1 - Stream Inv. 733



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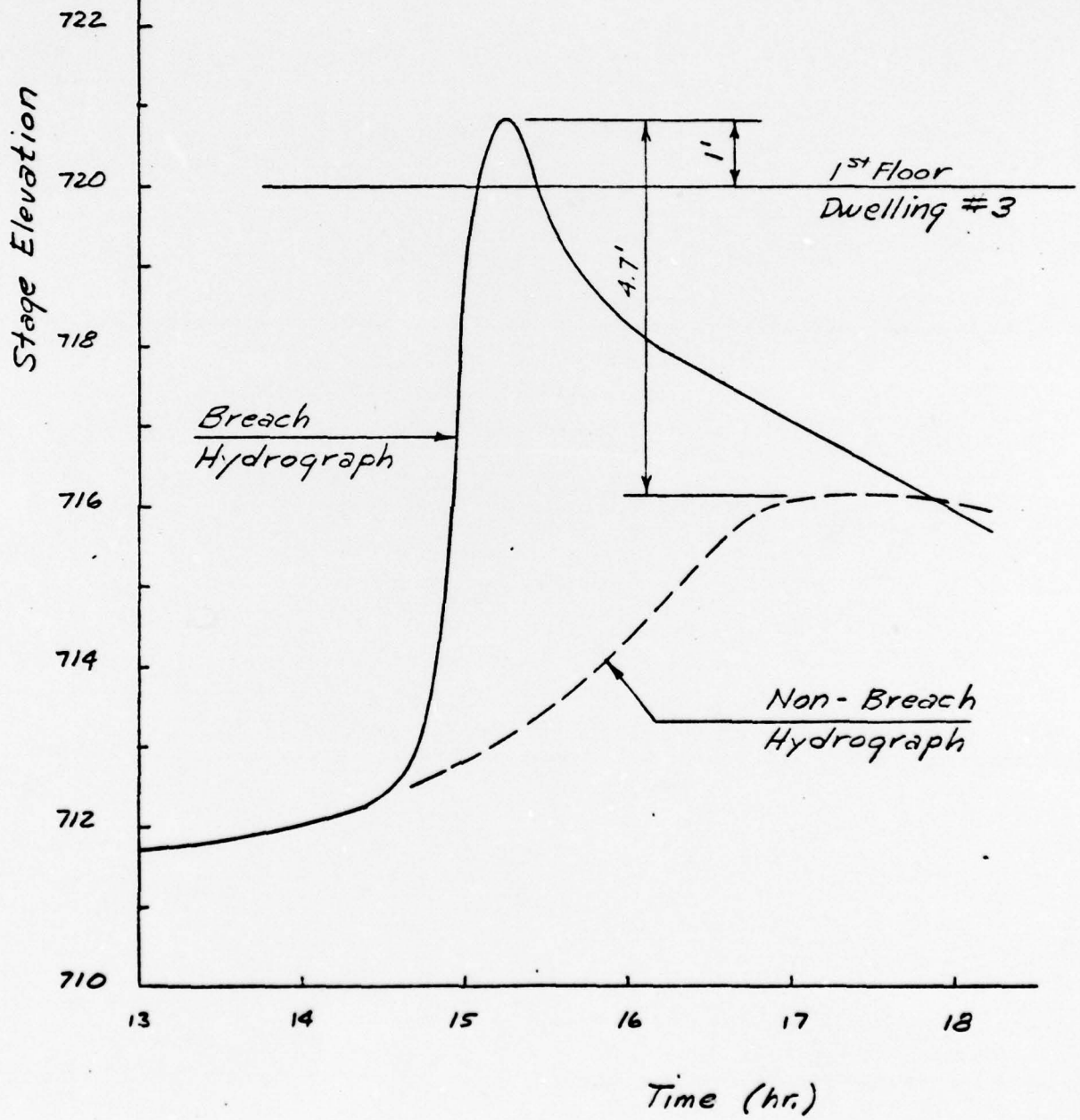
Hydrographs - Reach 2
Location # 3 - Stream Inv. 711



HEC-1-DB COMPUTATIONS

MULTI - RATIO ROUTING
(NO BREACH)

```
A1                 DAM SAFETY ANALYSIS  NEW JERSEY
A2            MT HOPE/ WHITE MEADOW LAKE DAM
A3         MULTI RATIO ROUTING
B     300        0        5                                  0        0        3
B1      5
J       1        5        1
J1    0.5      0.3     0.15      0.1     0.05
K       0     LAKE                        0        0        1
K1        SUBAREA INFLOW HYDROGRAPH TO MT HOPE LAKE
M       1        2      1.9                1.9        0                        1
P       0       25      100      109      117
T                                                        1.5     0.15
W2             0.42
X    -1.0    -0.05      2.0
K       1      DAM                        0        0        1
K1        ROUTE DISCHARGE THRU DAM
Y                                  1        1
Y1      1                                                -797       -1
Y4  796.5      797      799      801      802      803      804      805
Y5      0        4      232      636      958     1112     1382     1649
$A      0      190      294      420
$E    787      797      800      820
$$  796.5
$D    802     2.63      1.5     1252
K       0      WML                        0        0        1
K1            SUBAREA INFLOW HYDROGRAPH TO WHITE MEADOW LAKE
M       1        2      1.0                1.0        0                        1
P       0       25      100      109      117
T                                                        1.5     0.15
W2             0.66
X    -1.0    -0.05      2.0
K       2      WML                        0        0        1
K1        COMBINE HYDROGRAPHS IN WHITE MEADOW LAKE
K       1      WML                        0        0        1
K1         ROUTE HYDROGRAPH THRU WHITE MEADOW LAKE DAM
Y                                  1        1
Y1      1                                                -753       -1
Y4  752.7    753.7    754.7    755.7    756.7    757.7
Y5      0       76      216      396      610      853
$A      0      137      184
$E    746      753      760
$$  752.7
$D  753.7     2.63      1.5      300
K      99
A
A
A
A
A
```

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SUMMARY OF DAM SAFETY ANALYSIS MT. HOPE LAKE

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	797.00	796.50	802.00
STORAGE	633.	543.	1953.
OUTFLOW	4.	0.	858.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.50	800.42	0.00	1478.	519.	0.00	18.58	0.00
.30	799.25	0.00	1143.	282.	0.00	18.58	0.00
.15	798.20	0.00	885.	141.	0.00	18.58	0.00
.10	797.82	0.00	799.	97.	0.00	18.58	0.00
.05	797.41	0.00	713.	50.	0.00	18.58	0.00

SUMMARY OF DAM SAFETY ANALYSIS WHITE MEADOW LAKE

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	753.00	752.70	753.70
STORAGE	320.	280.	417.
OUTFLOW	23.	0.	76.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.50	755.08	1.38	518.	1556.	10.42	17.25	0.00
.30	754.49	.79	531.	746.	9.42	17.83	0.00
.15	753.97	.27	456.	228.	8.33	18.83	0.00
.10	753.72	.02	421.	82.	5.17	23.33	0.00
.05	753.28	0.00	359.	44.	0.00	22.50	0.00

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1/2 PMF ROUTING

(WITH BREACH)

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

```
RUNOFF HYDROGRAPH AT          LAKE
ROUTE HYDROGRAPH TO            DAM
RUNOFF HYDROGRAPH AT           WML
COMBINE  2 HYDROGRAPHS AT      WML
ROUTE HYDROGRAPH TO            WML
ROUTE HYDROGRAPH TO              1
ROUTE HYDROGRAPH TO              2
END OF NETWORK
```

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```
A1                 DAM SAFETY ANALYSIS  NEW JERSEY
A2            MT HOPE/ WHITE MEADOW LAKE DAM
A3           0.5 PMF BREACH AND CHANNEL ROUTING
B     300        0        5                                  0        0        3
B1      5
J       1        1        1
J1    0.5
K       0     LAKE                          0        0        1
K1       SUBAREA INFLOW HYDROGRAPH TO MT HOPE LAKE
M       1        2      1.9                1.9        0                        1
P       0       25      100      109       117
T                                                          1.5     0.15
W2            0.42
X    -1.0    -0.05      2.0
K       1      DAM                          0        0        1
K1        ROUTE DISCHARGE THRU DAM
Y                                  1        1
Y1      1                                                 -797       -1
Y4  796.5      797      799      801      802      803      804      805
Y5      0        4      232      636      858     1112     1382     1649
$A      0      190      294      420
$E    787      797      800      820
$$  796.5
$D    802     2.63      1.5     1252
K       0      WML                          0        0        1
K1           SUBAREA INFLOW HYDROGRAPH TO WHITE MEADOW LAKE
M       1        2      1.0                1.0        0                        1
P       0       25      100      109       117
T                                                          1.5     0.15
W2            0.66
X    -1.0    -0.05      2.0
K       2      WML                          0        0        1
K1        COMBINE HYDROGRAPHS IN WHITE MEADOW LAKE
K       1      WML                          0        0        1
K1         ROUTE HYDROGRAPH THRU WHITE MEADOW LAKE DAM
Y                                  1        1
Y1      1                                                 -753       -1
Y4  752.7    753.7    754.7    755.7    756.7    757.7
Y5      0       76      216      396      610      853
$A      0      137      184
$E    746      753      760
$$  752.7
$D  753.7     2.63      1.5      300
$B    120        1      746      0.5    753.0    753.7
K       1        1                                          1
K1       CHANNEL ROUTING  REACH 1
Y                                  1        1
Y1      1
Y6    0.1     0.04      0.1      732      740      250     0.01
Y7      0      740       10      738      110      738      180      732      190      732
Y7    220      734      340      734      390      740
K       1        2                                          1
K1        CHANNEL ROUTING   REACH 2
Y                                  1        1
Y1      1
Y6    0.1     0.04      0.1      712      720      900     0.02
Y7      0      720       50      716      100      712      108      712      118      716
Y7    123      718      140      718      145      720
K      99
A
A
A
A
A
```

```
*********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
*********************************

RUN  DATE# 79/06/22.
     TIME# 10.39.17.


                    DAM SAFETY ANALYSIS  NEW JERSEY
                 MT HOPE/ WHITE MEADOW LAKE DAM
               MULTI RATIO ROUTING

                                  JOB SPECIFICATION
          NQ     NHR    NMIN    IDAY     IHR    IMIN   METRC    IPLT    IPRT   NSTAN
         300       0       5       0       0       0       0       0       3       0
                                JOPER     NWT   LROPT   TRACE
                                    5       0       0       0

                          MULTI-PLAN ANALYSES TO BE PERFORMED
                              NPLAN= 1 NRTIO= 5 LRTIO= 1
        RTIOS=     .50     .30     .15     .10     .05


     **********      **********      **********      **********      **********

                          SUB-AREA RUNOFF COMPUTATION

          SUBAREA INFLOW HYDROGRAPH TO MT HOPE LAKE

                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                     LAKE       0       0       0       0       0       1       0       0

                                  HYDROGRAPH DATA
        IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
           1       2    1.90    0.00    1.90    0.00   0.000       0       1       0

                                   PRECIP DATA
                 SPFE     PMS      R6     R12     R24     R48     R72     R96
                 0.00   25.00  100.00  109.00  117.00    0.00    0.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS  .800

                                   LOSS DATA
      LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
          0    0.00    0.00    1.00    0.00    0.00    1.00    1.50     .15    0.00    0.00

                                 UNIT HYDROGRAPH DATA
                            TC=  0.00     LAG=    .42

                                  RECESSION DATA
                      STRTQ=    -1.00     QRCSN=     -.05     RTIOR= 2.00

        UNIT HYDROGRAPH 27 END OF PERIOD ORDINATES, TC=     0.00 HOURS, LAG=     .42   VOL= 1.00
     171.      523.     1090.     1676.     1966.     1969.     1758.     1461.     1063.      768.
     570.      436.      324.      241.      180.      134.       99.       74.       55.       41.
      30.       23.       19.       14.       10.        6.        3.
```

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FROM COPY FURNISHED TO DDC

PMF INFLOW HYDROGRAPH

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.05	1	.01	0.00	.01	2.
1.01	.10	2	.01	0.00	.01	2.
1.01	.15	3	.01	0.00	.01	2.
1.01	.20	4	.01	0.00	.01	1.
1.01	.25	5	.01	0.00	.01	1.
1.01	.30	6	.01	0.00	.01	1.
1.01	.35	7	.01	0.00	.01	1.
1.01	.40	8	.01	0.00	.01	1.
1.01	.45	9	.01	0.00	.01	1.
1.01	.50	10	.01	0.00	.01	1.
1.01	.55	11	.01	0.00	.01	1.
1.01	1.00	12	.01	0.00	.01	1.
1.01	1.05	13	.01	0.00	.01	1.
1.01	1.10	14	.01	0.00	.01	1.
1.01	1.15	15	.01	0.00	.01	1.
1.01	1.20	16	.01	0.00	.01	1.
1.01	1.25	17	.01	0.00	.01	1.
1.01	1.30	18	.01	0.00	.01	1.
1.01	1.35	19	.01	0.00	.01	1.
1.01	1.40	20	.01	0.00	.01	1.
1.01	1.45	21	.01	0.00	.01	1.
1.01	1.50	22	.01	0.00	.01	1.
1.01	1.55	23	.01	0.00	.01	1.
1.01	2.00	24	.01	0.00	.01	1.
1.01	2.05	25	.01	0.00	.01	1.
1.01	2.10	26	.01	0.00	.01	1.
1.01	2.15	27	.01	0.00	.01	1.
1.01	2.20	28	.01	0.00	.01	1.
1.01	2.25	29	.01	0.00	.01	1.
1.01	2.30	30	.01	0.00	.01	1.
1.01	2.35	31	.01	0.00	.01	1.
1.01	2.40	32	.01	0.00	.01	1.
1.01	2.45	33	.01	0.00	.01	1.
1.01	2.50	34	.01	0.00	.01	1.
1.01	2.55	35	.01	0.00	.01	1.
1.01	3.00	36	.01	0.00	.01	1.
1.01	3.05	37	.01	0.00	.01	1.
1.01	3.10	38	.01	0.00	.01	1.
1.01	3.15	39	.01	0.00	.01	1.
1.01	3.20	40	.01	0.00	.01	1.
1.01	3.25	41	.01	0.00	.01	1.
1.01	3.30	42	.01	0.00	.01	1.
1.01	3.35	43	.01	0.00	.01	1.
1.01	3.40	44	.01	0.00	.01	1.
1.01	3.45	45	.01	0.00	.01	1.
1.01	3.50	46	.01	0.00	.01	1.
1.01	3.55	47	.01	0.00	.01	1.
1.01	4.00	48	.01	0.00	.01	1.
1.01	4.05	49	.01	0.00	.01	1.
1.01	4.10	50	.01	0.00	.01	1.
1.01	4.15	51	.01	0.00	.01	1.
1.01	4.20	52	.01	0.00	.01	1.
1.01	4.25	53	.01	0.00	.01	1.
1.01	4.30	54	.01	0.00	.01	1.
1.01	4.35	55	.01	0.00	.01	1.
1.01	4.40	56	.01	0.00	.01	1.
1.01	4.45	57	.01	0.00	.01	1.
1.01	4.50	58	.01	0.00	.01	1.
1.01	4.55	59	.01	0.00	.01	1.
1.01	5.00	60	.01	0.00	.01	1.
1.01	5.05	61	.01	0.00	.01	1.
1.01	5.10	62	.01	0.00	.01	1.
1.01	5.15	63	.01	0.00	.01	1.
1.01	5.20	64	.01	0.00	.01	1.
1.01	5.25	65	.01	0.00	.01	1.
1.01	5.30	66	.01	0.00	.01	1.
1.01	5.35	67	.01	0.00	.01	1.
1.01	5.40	68	.01	0.00	.01	1.
1.01	5.45	69	.01	0.00	.01	1.
1.01	5.50	70	.01	0.00	.01	1.
1.01	5.55	71	.01	0.00	.01	1.
1.01	6.00	72	.01	0.00	.01	1.
1.01	6.05	73	.03	0.00	.03	2.
1.01	6.10	74	.03	0.00	.03	2.
1.01	6.15	75	.03	0.00	.03	2.
1.01	6.20	76	.03	0.00	.03	2.

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	6.25	77	.03	0.00	.03	0.
1.01	6.30	78	.03	0.00	.03	0.
1.01	6.35	79	.03	0.00	.03	0.
1.01	6.40	80	.03	0.00	.03	0.
1.01	6.45	81	.03	0.00	.03	0.
1.01	6.50	82	.03	0.00	.03	0.
1.01	6.55	83	.03	0.00	.03	0.
1.01	7.00	84	.03	0.00	.03	0.
1.01	7.05	85	.03	0.00	.03	0.
1.01	7.10	86	.03	0.00	.03	0.
1.01	7.15	87	.03	0.00	.03	0.
1.01	7.20	88	.03	0.00	.03	0.
1.01	7.25	89	.03	0.00	.03	0.
1.01	7.30	90	.03	0.00	.03	0.
1.01	7.35	91	.03	0.00	.03	0.
1.01	7.40	92	.03	0.00	.03	0.
1.01	7.45	93	.03	0.00	.03	0.
1.01	7.50	94	.03	0.00	.03	0.
1.01	7.55	95	.03	0.00	.03	0.
1.01	8.00	96	.03	0.00	.03	0.
1.01	8.05	97	.03	0.00	.03	0.
1.01	8.10	98	.03	0.00	.03	0.
1.01	8.15	99	.03	0.00	.03	0.
1.01	8.20	100	.03	0.00	.03	0.
1.01	8.25	101	.03	0.00	.03	0.
1.01	8.30	102	.03	0.00	.03	0.
1.01	8.35	103	.03	0.00	.03	0.
1.01	8.40	104	.03	0.00	.03	0.
1.01	8.45	105	.03	0.00	.03	0.
1.01	8.50	106	.03	0.00	.03	0.
1.01	8.55	107	.03	.01	.02	1.
1.01	9.00	108	.03	.01	.01	5.
1.01	9.05	109	.03	.01	.01	17.
1.01	9.10	110	.03	.01	.01	35.
1.01	9.15	111	.03	.01	.01	54.
1.01	9.20	112	.03	.01	.01	87.
1.01	9.25	113	.03	.01	.01	105.
1.01	9.30	114	.03	.01	.01	125.
1.01	9.35	115	.03	.01	.01	141.
1.01	9.40	116	.03	.01	.01	152.
1.01	9.45	117	.03	.01	.01	159.
1.01	9.50	118	.03	.01	.01	166.
1.01	9.55	119	.03	.01	.01	171.
1.01	10.00	120	.03	.01	.01	174.
1.01	10.05	121	.03	.01	.01	177.
1.01	10.10	122	.03	.01	.01	178.
1.01	10.15	123	.03	.01	.01	180.
1.01	10.20	124	.03	.01	.01	181.
1.01	10.25	125	.03	.01	.01	182.
1.01	10.30	126	.03	.01	.01	182.
1.01	10.35	127	.03	.01	.01	183.
1.01	10.40	128	.03	.01	.01	183.
1.01	10.45	129	.03	.01	.01	183.
1.01	10.50	130	.03	.01	.01	184.
1.01	10.55	131	.03	.01	.01	184.
1.01	11.00	132	.03	.01	.01	184.
1.01	11.05	133	.03	.01	.01	184.
1.01	11.10	134	.03	.01	.01	184.
1.01	11.15	135	.03	.01	.01	184.
1.01	11.20	136	.03	.01	.01	184.
1.01	11.25	137	.03	.01	.01	184.
1.01	11.30	138	.03	.01	.01	184.
1.01	11.35	139	.03	.01	.01	184.
1.01	11.40	140	.03	.01	.01	184.
1.01	11.45	141	.03	.01	.01	184.
1.01	11.50	142	.03	.01	.01	184.
1.01	11.55	143	.03	.01	.01	184.
1.01	12.00	144	.03	.01	.01	184.
1.01	12.05	145	.17	.15	.01	206.
1.01	12.10	146	.17	.15	.01	282.
1.01	12.15	147	.17	.15	.01	437.
1.01	12.20	148	.17	.15	.01	674.
1.01	12.25	149	.17	.15	.01	953.
1.01	12.30	150	.17	.15	.01	1232.

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	18.55	227	.01	.00	.01	495.
1.01	19.00	228	.01	.00	.01	462.
1.01	19.05	229	.01	.00	.01	431.
1.01	19.10	230	.01	.00	.01	402.
1.01	19.15	231	.01	.00	.01	375.
1.01	19.20	232	.01	.00	.01	350.
1.01	19.25	233	.01	.00	.01	326.
1.01	19.30	234	.01	.00	.01	305.
1.01	19.35	235	.01	.00	.01	284.
1.01	19.40	236	.01	.00	.01	265.
1.01	19.45	237	.01	.00	.01	247.
1.01	19.50	238	.01	.00	.01	231.
1.01	19.55	239	.01	.00	.01	215.
1.01	20.00	240	.01	.00	.01	201.
1.01	20.05	241	.01	.00	.01	187.
1.01	20.10	242	.01	.00	.01	175.
1.01	20.15	243	.01	.00	.01	163.
1.01	20.20	244	.01	.00	.01	152.
1.01	20.25	245	.01	.00	.01	142.
1.01	20.30	246	.01	.00	.01	133.
1.01	20.35	247	.01	.00	.01	124.
1.01	20.40	248	.01	.00	.01	115.
1.01	20.45	249	.01	.00	.01	108.
1.01	20.50	250	.01	.00	.01	100.
1.01	20.55	251	.01	.00	.01	94.
1.01	21.00	252	.01	.00	.01	87.
1.01	21.05	253	.01	.00	.01	82.
1.01	21.10	254	.01	.00	.01	76.
1.01	21.15	255	.01	.00	.01	71.
1.01	21.20	256	.01	.00	.01	66.
1.01	21.25	257	.01	.00	.01	62.
1.01	21.30	258	.01	.00	.01	58.
1.01	21.35	259	.01	.00	.01	54.
1.01	21.40	260	.01	.00	.01	50.
1.01	21.45	261	.01	.00	.01	47.
1.01	21.50	262	.01	.00	.01	44.
1.01	21.55	263	.01	.00	.01	41.
1.01	22.00	264	.01	.00	.01	38.
1.01	22.05	265	.01	.00	.01	36.
1.01	22.10	266	.01	.00	.01	33.
1.01	22.15	267	.01	.00	.01	31.
1.01	22.20	268	.01	.00	.01	29.
1.01	22.25	269	.01	.00	.01	27.
1.01	22.30	270	.01	.00	.01	25.
1.01	22.35	271	.01	.00	.01	23.
1.01	22.40	272	.01	.00	.01	22.
1.01	22.45	273	.01	.00	.01	20.
1.01	22.50	274	.01	.00	.01	19.
1.01	22.55	275	.01	.00	.01	18.
1.01	23.00	276	.01	.00	.01	17.
1.01	23.05	277	.01	.00	.01	15.
1.01	23.10	278	.01	.00	.01	14.
1.01	23.15	279	.01	.00	.01	13.
1.01	23.20	280	.01	.00	.01	13.
1.01	23.25	281	.01	.00	.01	12.
1.01	23.30	282	.01	.00	.01	12.
1.01	23.35	283	.01	.00	.01	12.
1.01	23.40	284	.01	.00	.01	12.
1.01	23.45	285	.01	.00	.01	12.
1.01	23.50	286	.01	.00	.01	12.
1.01	23.55	287	.01	.00	.01	12.
1.02	0.00	288	.01	.00	.01	12.
1.02	.05	289	0.00	0.00	0.00	12.
1.02	.10	290	0.00	0.00	0.00	12.
1.02	.15	291	0.00	0.00	0.00	11.
1.02	.20	292	0.00	0.00	0.00	10.
1.02	.25	293	0.00	0.00	0.00	9.
1.02	.30	294	0.00	0.00	0.00	9.
1.02	.35	295	0.00	0.00	0.00	8.
1.02	.40	296	0.00	0.00	0.00	8.
1.02	.45	297	0.00	0.00	0.00	7.
1.02	.50	298	0.00	0.00	0.00	7.
1.02	.55	299	0.00	0.00	0.00	6.
1.02	1.00	300	0.00	0.00	0.00	6.
		SUM	23.40	19.63	3.77	294370.
			(594.)	(499.)	(96.)	(8335.63)

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	18.55	227	.01	.00	.01	495.
1.01	19.00	228	.01	.00	.01	462.
1.01	19.05	229	.01	.00	.01	431.
1.01	19.10	230	.01	.00	.01	402.
1.01	19.15	231	.01	.00	.01	375.
1.01	19.20	232	.01	.00	.01	350.
1.01	19.25	233	.01	.00	.01	326.
1.01	19.30	234	.01	.00	.01	305.
1.01	19.35	235	.01	.00	.01	284.
1.01	19.40	236	.01	.00	.01	265.
1.01	19.45	237	.01	.00	.01	247.
1.01	19.50	238	.01	.00	.01	231.
1.01	19.55	239	.01	.00	.01	215.
1.01	20.00	240	.01	.00	.01	201.
1.01	20.05	241	.01	.00	.01	187.
1.01	20.10	242	.01	.00	.01	175.
1.01	20.15	243	.01	.00	.01	163.
1.01	20.20	244	.01	.00	.01	152.
1.01	20.25	245	.01	.00	.01	142.
1.01	20.30	246	.01	.00	.01	133.
1.01	20.35	247	.01	.00	.01	124.
1.01	20.40	248	.01	.00	.01	115.
1.01	20.45	249	.01	.00	.01	108.
1.01	20.50	250	.01	.00	.01	100.
1.01	20.55	251	.01	.00	.01	94.
1.01	21.00	252	.01	.00	.01	87.
1.01	21.05	253	.01	.00	.01	82.
1.01	21.10	254	.01	.00	.01	76.
1.01	21.15	255	.01	.00	.01	71.
1.01	21.20	256	.01	.00	.01	66.
1.01	21.25	257	.01	.00	.01	62.
1.01	21.30	258	.01	.00	.01	58.
1.01	21.35	259	.01	.00	.01	54.
1.01	21.40	260	.01	.00	.01	50.
1.01	21.45	261	.01	.00	.01	47.
1.01	21.50	262	.01	.00	.01	44.
1.01	21.55	263	.01	.00	.01	41.
1.01	22.00	264	.01	.00	.01	38.
1.01	22.05	265	.01	.00	.01	36.
1.01	22.10	266	.01	.00	.01	33.
1.01	22.15	267	.01	.00	.01	31.
1.01	22.20	268	.01	.00	.01	29.
1.01	22.25	269	.01	.00	.01	27.
1.01	22.30	270	.01	.00	.01	25.
1.01	22.35	271	.01	.00	.01	23.
1.01	22.40	272	.01	.00	.01	22.
1.01	22.45	273	.01	.00	.01	20.
1.01	22.50	274	.01	.00	.01	19.
1.01	22.55	275	.01	.00	.01	18.
1.01	23.00	276	.01	.00	.01	17.
1.01	23.05	277	.01	.00	.01	15.
1.01	23.10	278	.01	.00	.01	14.
1.01	23.15	279	.01	.00	.01	13.
1.01	23.20	280	.01	.00	.01	13.
1.01	23.25	281	.01	.00	.01	12.
1.01	23.30	282	.01	.00	.01	12.
1.01	23.35	283	.01	.00	.01	12.
1.01	23.40	284	.01	.00	.01	12.
1.01	23.45	285	.01	.00	.01	12.
1.01	23.50	286	.01	.00	.01	12.
1.01	23.55	287	.01	.00	.01	12.
1.02	0.00	288	.01	.00	.01	12.
1.02	.05	289	0.00	0.00	0.00	12.
1.02	.10	290	0.00	0.00	0.00	12.
1.02	.15	291	0.00	0.00	0.00	11.
1.02	.20	292	0.00	0.00	0.00	10.
1.02	.25	293	0.00	0.00	0.00	9.
1.02	.30	294	0.00	0.00	0.00	9.
1.02	.35	295	0.00	0.00	0.00	8.
1.02	.40	296	0.00	0.00	0.00	8.
1.02	.45	297	0.00	0.00	0.00	7.
1.02	.50	298	0.00	0.00	0.00	7.
1.02	.55	299	0.00	0.00	0.00	6.
1.02	1.00	300	0.00	0.00	0.00	6.
		SUM	23.40	19.63	3.77	294370.
			(594.)	(499.)	(96.)	(8335.63)

HYDROGRAPH ROUTING

ROUTE DISCHARGE THRU DAM Mt HOPE LAKE DAM

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
DAM	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	0.000	0.00	1	1	0	0		0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-797.	-1

STAGE	796.50	797.00	799.00	801.00	802.00	803.00	804.00	805.00
FLOW	0.00	4.00	232.00	636.00	856.00	1112.00	1382.00	1649.00
SURFACE AREA=	0.	130.	294.	420.				
CAPACITY=	0.	633.	1354.	8456.				
ELEVATION=	787.	797.	800.	820.				

CREL	SPWID	COQW	EXPW	ELEVL	COOL	CAREA	EXPL
795.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COGD	EXPD	DAMWID
802.0	2.6	1.5	1252.

STATION DAM, PLAN 1, RATIO 1 - ½ PMF

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	5.
5.	5.	5.	6.	7.	7.	7.	8.	8.	8.
9.	9.	9.	10.	10.	10.	11.	11.	11.	12.
12.	12.	13.	13.	13.	14.	14.	15.	17.	19.
22.	25.	28.	32.	36.	40.	43.	47.	52.	56.
60.	64.	69.	74.	78.	83.	87.	92.	97.	101.
106.	111.	115.	120.	125.	131.	136.	141.	147.	152.
157.	163.	167.	172.	178.	183.	190.	199.	210.	224.
247.	276.	304.	329.	349.	366.	383.	395.	406.	415.
424.	432.	439.	445.	452.	458.	464.	469.	474.	479.
484.	488.	492.	496.	500.	504.	507.	511.	514.	516.
518.	519.	519.	519.	518.	516.	515.	514.	513.	511.
510.	508.	507.	505.	503.	502.	500.	498.	496.	494.
492.	491.	489.	487.	485.	483.	481.	479.	477.	475.
473.	471.	469.	467.	465.	463.	461.	459.	457.	455.
453.	451.	449.	447.	445.	443.	441.	439.	437.	435.
433.	431.	429.	427.	425.	423.	421.	419.	417.	415.
413.	411.	409.	407.	405.	403.	401.	399.	397.	396.
394.	392.	390.	388.	386.	384.	382.	381.	379.	377.

STORAGE

633.	633.	633.	633.	633.	633.	633.	633.	633.	633.
633.	633.	633.	633.	633.	633.	633.	633.	633.	633.
633.	633.	633.	633.	633.	633.	633.	633.	633.	633.
633.	633.	633.	632.	632.	632.	632.	632.	632.	632.
632.	632.	632.	632.	632.	632.	632.	632.	632.	632.
632.	632.	632.	632.	632.	632.	632.	632.	632.	632.
632.	632.	632.	632.	632.	632.	632.	632.	632.	632.
632.	631.	631.	631.	631.	631.	631.	631.	631.	631.
631.	631.	631.	631.	631.	631.	631.	631.	631.	631.
631.	631.	631.	631.	631.	631.	631.	631.	631.	631.
631.	631.	631.	631.	631.	631.	631.	631.	631.	631.
631.	631.	631.	632.	632.	633.	633.	634.	634.	635.
635.	636.	636.	637.	638.	638.	639.	639.	640.	640.
641.	642.	642.	643.	643.	644.	644.	645.	645.	646.
647.	647.	649.	648.	649.	650.	651.	652.	655.	659.
663.	669.	674.	681.	687.	694.	701.	708.	715.	723.
731.	739.	747.	755.	764.	772.	781.	789.	798.	807.
816.	825.	834.	844.	854.	864.	875.	885.	896.	907.
917.	928.	938.	949.	960.	972.	986.	1005.	1030.	1061.
1097.	1135.	1172.	1205.	1235.	1259.	1280.	1298.	1313.	1327.
1339.	1350.	1361.	1370.	1380.	1388.	1397.	1405.	1412.	1420.
1426.	1432.	1438.	1444.	1450.	1455.	1461.	1466.	1470.	1474.
1478.	1478.	1478.	1477.	1476.	1474.	1472.	1471.	1469.	1466.
1464.	1462.	1460.	1457.	1455.	1452.	1450.	1447.	1444.	1442.
1439.	1436.	1433.	1431.	1428.	1425.	1422.	1419.	1416.	1413.
1410.	1408.	1405.	1402.	1399.	1396.	1393.	1390.	1387.	1384.
1381.	1378.	1375.	1372.	1369.	1366.	1363.	1360.	1357.	1354.
1352.	1349.	1346.	1343.	1340.	1337.	1334.	1332.	1329.	1326.
1323.	1320.	1317.	1315.	1312.	1309.	1307.	1304.	1301.	1298.
1296.	1293.	1290.	1288.	1285.	1283.	1280.	1277.	1275.	1272.

STAGE

797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.0	797.1	797.1	797.1	797.1	797.1	797.1
797.1	797.1	797.1	797.1	797.1	797.1	797.1	797.1	797.1	797.1
797.2	797.2	797.2	797.2	797.3	797.3	797.3	797.4	797.4	797.5
797.5	797.5	797.6	797.6	797.7	797.7	797.7	797.8	797.8	797.9
797.9	797.9	798.0	798.0	798.1	798.1	798.2	798.2	798.3	798.3
798.3	798.4	798.4	798.5	798.5	798.6	798.6	798.7	798.8	798.9
799.1	799.2	799.4	799.5	799.6	799.7	799.7	799.8	799.9	799.9
800.0	800.0	800.0	800.1	800.1	800.1	800.1	800.2	800.2	800.2
800.2	800.3	800.3	800.3	800.3	800.3	800.4	800.4	800.4	800.4
800.4	800.4	800.4	800.4	800.4	800.4	800.4	800.4	800.4	800.4
800.4	800.4	800.4	800.4	800.4	800.3	800.3	800.3	800.3	800.3
800.3	800.3	800.3	800.3	800.3	800.3	800.2	800.2	800.2	800.2
800.2	800.2	800.2	800.2	800.2	800.2	800.1	800.1	800.1	800.1
800.1	800.1	800.1	800.1	800.1	800.1	800.0	800.0	800.0	800.0
800.0	800.0	800.0	800.0	800.0	799.9	799.9	799.9	799.9	799.9
799.9	799.9	799.9	799.9	799.9	799.8	799.8	799.8	799.8	799.8
799.8	799.8	799.8	799.8	799.8	799.8	799.7	799.7	799.7	799.7

PEAK OUTFLOW IS 519. AT TIME 18.58 HOURS

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SUB-AREA RUNOFF COMPUTATION

SUBAREA INFLOW HYDROGRAPH TO WHITE MEADOW LAKE

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
WML	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	2	1.00	0.00	1.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	25.00	100.00	109.00	117.00	0.00	0.00	0.00

) BY THE PROGRAM IS .800

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.50	.15	0.00	0.00

UNIT HYDROGRAPH DATA

TC= 0.00 LAG= .66

RECESSION DATA

STRTQ= -1.00 QRCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH 42 END OF PERIOD ORDINATES, TC= 0.00 HOURS, LAG= .66 VOL= 1.00

30.	92.	177.	296.	446.	574.	653.	685.	683.	645.	
568.	519.	432.	342.	277.	227.	188.	158.	131.	106.	
88.	72.	60.	49.	40.	33.	27.	23.	19.	15.	
13.	10.	9.	7.	6.	5.	4.	3.	3.	2.	
1.	0.									

PMF SUB-AREA INFLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.05	1	.01	0.00	.01	1.
1.01	.10	2	.01	0.00	.01	1.
1.01	.15	3	.01	0.00	.01	1.
1.01	.20	4	.01	0.00	.01	1.
1.01	.25	5	.01	0.00	.01	1.
1.01	.30	6	.01	0.00	.01	1.
1.01	.35	7	.01	0.00	.01	1.
1.01	.40	8	.01	0.00	.01	1.
1.01	.45	9	.01	0.00	.01	1.
1.01	.50	10	.01	0.00	.01	0.
1.01	.55	11	.01	0.00	.01	0.
1.01	1.00	12	.01	0.00	.01	0.
1.01	1.05	13	.01	0.00	.01	0.
1.01	1.10	14	.01	0.00	.01	0.
1.01	1.15	15	.01	0.00	.01	0.
1.01	1.20	16	.01	0.00	.01	0.
1.01	1.25	17	.01	0.00	.01	0.
1.01	1.30	18	.01	0.00	.01	0.
1.01	1.35	19	.01	0.00	.01	0.
1.01	1.40	20	.01	0.00	.01	0.
1.01	1.45	21	.01	0.00	.01	0.
1.01	1.50	22	.01	0.00	.01	0.
1.01	1.55	23	.01	0.00	.01	0.
1.01	2.00	24	.01	0.00	.01	0.
1.01	2.05	25	.01	0.00	.01	0.
1.01	2.10	26	.01	0.00	.01	0.
1.01	2.15	27	.01	0.00	.01	0.
1.01	2.20	28	.01	0.00	.01	0.
1.01	2.25	29	.01	0.00	.01	0.
1.01	2.30	30	.01	0.00	.01	0.
1.01	2.35	31	.01	0.00	.01	0.
1.01	2.40	32	.01	0.00	.01	0.
1.01	2.45	33	.01	0.00	.01	0.
1.01	2.50	34	.01	0.00	.01	0.
1.01	2.55	35	.01	0.00	.01	0.
1.01	3.00	36	.01	0.00	.01	0.
1.01	3.05	37	.01	0.00	.01	0.
1.01	3.10	38	.01	0.00	.01	0.
1.01	3.15	39	.01	0.00	.01	0.
1.01	3.20	40	.01	0.00	.01	0.
1.01	3.25	41	.01	0.00	.01	0.
1.01	3.30	42	.01	0.00	.01	0.
1.01	3.35	43	.01	0.00	.01	0.
1.01	3.40	44	.01	0.00	.01	0.
1.01	3.45	45	.01	0.00	.01	0.
1.01	3.50	46	.01	0.00	.01	0.
1.01	3.55	47	.01	0.00	.01	0.
1.01	4.00	48	.01	0.00	.01	0.
1.01	4.05	49	.01	0.00	.01	0.
1.01	4.10	50	.01	0.00	.01	0.
1.01	4.15	51	.01	0.00	.01	0.
1.01	4.20	52	.01	0.00	.01	0.
1.01	4.25	53	.01	0.00	.01	0.
1.01	4.30	54	.01	0.00	.01	0.
1.01	4.35	55	.01	0.00	.01	0.
1.01	4.40	56	.01	0.00	.01	0.
1.01	4.45	57	.01	0.00	.01	0.
1.01	4.50	58	.01	0.00	.01	0.
1.01	4.55	59	.01	0.00	.01	0.
1.01	5.00	60	.01	0.00	.01	0.
1.01	5.05	61	.01	0.00	.01	0.
1.01	5.10	62	.01	0.00	.01	0.
1.01	5.15	63	.01	0.00	.01	0.
1.01	5.20	64	.01	0.00	.01	0.
1.01	5.25	65	.01	0.00	.01	0.
1.01	5.30	66	.01	0.00	.01	0.
1.01	5.35	67	.01	0.00	.01	0.
1.01	5.40	68	.01	0.00	.01	0.
1.01	5.45	69	.01	0.00	.01	0.
1.01	5.50	70	.01	0.00	.01	0.
1.01	5.55	71	.01	0.00	.01	0.
1.01	6.00	72	.01	0.00	.01	0.
1.01	6.05	73	.03	0.00	.03	0.
1.01	6.10	74	.03	0.00	.03	0.
1.01	6.15	75	.03	0.00	.03	0.
1.01	6.20	76	.03	0.00	.03	0.
1.01	6.25	77	.03	0.00	.03	0.

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	6.30	78	.03	0.00	.03	0.
1.01	6.35	79	.03	0.00	.03	0.
1.01	6.40	80	.03	0.00	.03	0.
1.01	6.45	81	.03	0.00	.03	0.
1.01	6.50	82	.03	0.00	.03	0.
1.01	6.55	83	.03	0.00	.03	0.
1.01	7.00	84	.03	0.00	.03	0.
1.01	7.05	85	.03	0.00	.03	0.
1.01	7.10	86	.03	0.00	.03	0.
1.01	7.15	87	.03	0.00	.03	0.
1.01	7.20	88	.03	0.00	.03	0.
1.01	7.25	89	.03	0.00	.03	0.
1.01	7.30	90	.03	0.00	.03	0.
1.01	7.35	91	.03	0.00	.03	0.
1.01	7.40	92	.03	0.00	.03	0.
1.01	7.45	93	.03	0.00	.03	0.
1.01	7.50	94	.03	0.00	.03	0.
1.01	7.55	95	.03	0.00	.03	0.
1.01	8.00	96	.03	0.00	.03	0.
1.01	8.05	97	.03	0.00	.03	0.
1.01	8.10	98	.03	0.00	.03	0.
1.01	8.15	99	.03	0.00	.03	0.
1.01	8.20	100	.03	0.00	.03	0.
1.01	8.25	101	.03	0.00	.03	0.
1.01	8.30	102	.03	0.00	.03	0.
1.01	8.35	103	.03	0.00	.03	0.
1.01	8.40	104	.03	0.00	.03	0.
1.01	8.45	105	.03	0.00	.03	0.
1.01	8.50	106	.03	0.00	.03	0.
1.01	8.55	107	.03	.01	.02	0.
1.01	9.00	108	.03	.01	.01	1.
1.01	9.05	109	.03	.01	.01	3.
1.01	9.10	110	.03	.01	.01	5.
1.01	9.15	111	.03	.01	.01	11.
1.01	9.20	112	.03	.01	.01	17.
1.01	9.25	113	.03	.01	.01	25.
1.01	9.30	114	.03	.01	.01	33.
1.01	9.35	115	.03	.01	.01	42.
1.01	9.40	116	.03	.01	.01	50.
1.01	9.45	117	.03	.01	.01	58.
1.01	9.50	118	.03	.01	.01	65.
1.01	9.55	119	.03	.01	.01	71.
1.01	10.00	120	.03	.01	.01	75.
1.01	10.05	121	.03	.01	.01	78.
1.01	10.10	122	.03	.01	.01	82.
1.01	10.15	123	.03	.01	.01	85.
1.01	10.20	124	.03	.01	.01	87.
1.01	10.25	125	.03	.01	.01	89.
1.01	10.30	126	.03	.01	.01	90.
1.01	10.35	127	.03	.01	.01	91.
1.01	10.40	128	.03	.01	.01	92.
1.01	10.45	129	.03	.01	.01	93.
1.01	10.50	130	.03	.01	.01	94.
1.01	10.55	131	.03	.01	.01	94.
1.01	11.00	132	.03	.01	.01	95.
1.01	11.05	133	.03	.01	.01	95.
1.01	11.10	134	.03	.01	.01	95.
1.01	11.15	135	.03	.01	.01	96.
1.01	11.20	136	.03	.01	.01	96.
1.01	11.25	137	.03	.01	.01	96.
1.01	11.30	138	.03	.01	.01	96.
1.01	11.35	139	.03	.01	.01	96.
1.01	11.40	140	.03	.01	.01	96.
1.01	11.45	141	.03	.01	.01	96.
1.01	11.50	142	.03	.01	.01	97.
1.01	11.55	143	.03	.01	.01	97.
1.01	12.00	144	.03	.01	.01	97.
1.01	12.05	145	.17	.15	.01	101.
1.01	12.10	146	.17	.15	.01	114.
1.01	12.15	147	.17	.15	.01	139.
1.01	12.20	148	.17	.15	.01	181.
1.01	12.25	149	.17	.15	.01	244.
1.01	12.30	150	.17	.15	.01	325.

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	12.35	151	.17	.15	.01	418.
1.01	12.40	152	.17	.15	.01	515.
1.01	12.45	153	.17	.15	.01	612.
1.01	12.50	154	.17	.15	.01	709.
1.01	12.55	155	.17	.15	.01	766.
1.01	13.00	156	.17	.15	.01	860.
1.01	13.05	157	.20	.19	.01	922.
1.01	13.10	158	.20	.19	.01	974.
1.01	13.15	159	.20	.19	.01	1019.
1.01	13.20	160	.20	.19	.01	1061.
1.01	13.25	161	.20	.19	.01	1102.
1.01	13.30	162	.20	.19	.01	1144.
1.01	13.35	163	.20	.19	.01	1184.
1.01	13.40	164	.20	.19	.01	1222.
1.01	13.45	165	.20	.19	.01	1257.
1.01	13.50	166	.20	.19	.01	1289.
1.01	13.55	167	.20	.19	.01	1317.
1.01	14.00	168	.20	.19	.01	1342.
1.01	14.05	169	.25	.24	.01	1363.
1.01	14.10	170	.25	.24	.01	1384.
1.01	14.15	171	.25	.24	.01	1406.
1.01	14.20	172	.25	.24	.01	1431.
1.01	14.25	173	.25	.24	.01	1463.
1.01	14.30	174	.25	.24	.01	1498.
1.01	14.35	175	.25	.24	.01	1538.
1.01	14.40	176	.25	.24	.01	1577.
1.01	14.45	177	.25	.24	.01	1615.
1.01	14.50	178	.25	.24	.01	1651.
1.01	14.55	179	.25	.24	.01	1683.
1.01	15.00	180	.25	.24	.01	1711.
1.01	15.05	181	.15	.14	.01	1732.
1.01	15.10	182	.30	.29	.01	1746.
1.01	15.15	183	.30	.29	.01	1758.
1.01	15.20	184	.46	.44	.01	1773.
1.01	15.25	185	.53	.52	.01	1800.
1.01	15.30	186	1.29	1.28	.01	1877.
1.01	15.35	187	2.13	2.12	.01	2060.
1.01	15.40	188	.84	.82	.01	2362.
1.01	15.45	189	.53	.52	.01	2770.
1.01	15.50	190	.46	.44	.01	3254.
1.01	15.55	191	.30	.29	.01	3843.
1.01	16.00	192	.30	.29	.01	4522.
1.01	16.05	193	.23	.22	.01	4648.
1.01	16.10	194	.23	.22	.01	4209.
1.01	16.15	195	.23	.22	.01	4814.
1.01	16.20	196	.23	.22	.01	4677.
1.01	16.25	197	.23	.22	.01	4442.
1.01	16.30	198	.23	.22	.01	4133.
1.01	16.35	199	.23	.22	.01	3773.
1.01	16.40	200	.23	.22	.01	3419.
1.01	16.45	201	.23	.22	.01	3119.
1.01	16.50	202	.23	.22	.01	2870.
1.01	16.55	203	.23	.22	.01	2668.
1.01	17.00	204	.23	.22	.01	2504.
1.01	17.05	205	.18	.17	.01	2353.
1.01	17.10	206	.18	.17	.01	2242.
1.01	17.15	207	.18	.17	.01	2159.
1.01	17.20	208	.18	.17	.01	2046.
1.01	17.25	209	.18	.17	.01	1950.
1.01	17.30	210	.18	.17	.01	1877.
1.01	17.35	211	.18	.17	.01	1800.
1.01	17.40	212	.18	.17	.01	1730.
1.01	17.45	213	.18	.17	.01	1666.
1.01	17.50	214	.18	.17	.01	1610.
1.01	17.55	215	.18	.17	.01	1560.
1.01	18.00	216	.19	.17	.01	1518.
1.01	18.05	217	.01	.00	.01	1477.
1.01	18.10	218	.01	.00	.01	1433.
1.01	18.15	219	.01	.00	.01	1380.
1.01	18.20	220	.01	.00	.01	1312.
1.01	18.25	221	.01	.00	.01	1221.
1.01	18.30	222	.01	.00	.01	1110.
1.01	18.35	223	.01	.00	.01	988.
1.01	18.40	224	.01	.00	.01	861.
1.01	18.45	225	.01	.00	.01	737.
1.01	18.50	226	.01	.00	.01	620.
1.01	18.55	227	.01	.00	.01	513.

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MO.DA (C)	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	19.00	228	.01	.00	.01	420.
1.01	19.05	229	.01	.00	.01	343.
1.01	19.10	230	.01	.00	.01	293.
1.01	19.15	231	.01	.00	.01	256.
1.01	19.20	232	.01	.00	.01	232.
1.01	19.25	233	.01	.00	.01	218.
1.01	19.30	234	.01	.00	.01	194.
1.01	19.35	235	.01	.00	.01	181.
1.01	19.40	236	.01	.00	.01	169.
1.01	19.45	237	.01	.00	.01	157.
1.01	19.50	238	.01	.00	.01	147.
1.01	19.55	239	.01	.00	.01	137.
1.01	20.00	240	.01	.00	.01	128.
1.01	20.05	241	.01	.00	.01	119.
1.01	20.10	242	.01	.00	.01	111.
1.01	20.15	243	.01	.00	.01	104.
1.01	20.20	244	.01	.00	.01	97.
1.01	20.25	245	.01	.00	.01	90.
1.01	20.30	246	.01	.00	.01	84.
1.01	20.35	247	.01	.00	.01	79.
1.01	20.40	248	.01	.00	.01	73.
1.01	20.45	249	.01	.00	.01	68.
1.01	20.50	250	.01	.00	.01	64.
1.01	20.55	251	.01	.00	.01	60.
1.01	21.00	252	.01	.00	.01	56.
1.01	21.05	253	.01	.00	.01	52.
1.01	21.10	254	.01	.00	.01	49.
1.01	21.15	255	.01	.00	.01	45.
1.01	21.20	256	.01	.00	.01	42.
1.01	21.25	257	.01	.00	.01	39.
1.01	21.30	258	.01	.00	.01	37.
1.01	21.35	259	.01	.00	.01	34.
1.01	21.40	260	.01	.00	.01	32.
1.01	21.45	261	.01	.00	.01	30.
1.01	21.50	262	.01	.00	.01	28.
1.01	21.55	263	.01	.00	.01	26.
1.01	22.00	264	.01	.00	.01	24.
1.01	22.05	265	.01	.00	.01	23.
1.01	22.10	266	.01	.00	.01	21.
1.01	22.15	267	.01	.00	.01	20.
1.01	22.20	268	.01	.00	.01	18.
1.01	22.25	269	.01	.00	.01	17.
1.01	22.30	270	.01	.00	.01	16.
1.01	22.35	271	.01	.00	.01	15.
1.01	22.40	272	.01	.00	.01	14.
1.01	22.45	273	.01	.00	.01	13.
1.01	22.50	274	.01	.00	.01	12.
1.01	22.55	275	.01	.00	.01	11.
1.01	23.00	276	.01	.00	.01	11.
1.01	23.05	277	.01	.00	.01	10.
1.01	23.10	278	.01	.00	.01	9.
1.01	23.15	279	.01	.00	.01	9.
1.01	23.20	280	.01	.00	.01	8.
1.01	23.25	281	.01	.00	.01	7.
1.01	23.30	282	.01	.00	.01	7.
1.01	23.35	283	.01	.00	.01	6.
1.01	23.40	284	.01	.00	.01	6.
1.01	23.45	285	.01	.00	.01	6.
1.01	23.50	286	.01	.00	.01	6.
1.01	23.55	287	.01	.00	.01	6.
1.02	0.00	288	.01	.00	.01	5.
1.02	.05	289	0.00	0.00	0.00	5.
1.02	.10	290	0.00	0.00	0.00	6.
1.02	.15	291	0.00	0.00	0.00	6.
1.02	.20	292	0.00	0.00	0.00	6.
1.02	.25	293	0.00	0.00	0.00	6.
1.02	.30	294	0.00	0.00	0.00	5.
1.02	.35	295	0.00	0.00	0.00	5.
1.02	.40	296	0.00	0.00	0.00	5.
1.02	.45	297	0.00	0.00	0.00	4.
1.02	.50	298	0.00	0.00	0.00	4.
1.02	.55	299	0.00	0.00	0.00	4.
1.02	1.00	300	0.00	0.00	0.00	3.
		SUM	23.40	19.63	3.77	153814.
			(594.)	(499.)	(96.)	(4355.53)

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COMBINE HYDROGRAPHS

COMBINE HYDROGRAPHS IN WHITE MEADOW LAKE

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
WML	2	0	0	0	0	1	0	0

SUM OF 2 HYDROGRAPHS AT WML PLAN 1 RTIO 1

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2757.	1287.	455.	437.	131061.
CMS	78.	36.	13.	12.	3711.
INCHES		4.13	5.84	5.84	5.84
MM		104.85	148.26	148.31	148.31
AC-FT		638.	902.	903.	903.
THOUS CU M		787.	1113.	1113.	1113.

********** ********** ********** ********* *********

HYDROGRAPH ROUTING

ROUTE HYDROGRAPH THRU WHITE MEADOW LAKE DAM

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
WML	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-753.	-1

STAGE	752.70	753.70	754.70	755.70	756.70	757.70
FLOW	0.00	76.00	216.00	396.00	610.00	853.00
SURFACE AREA=	0.	137.	184.			
CAPACITY=	0.	320.	1439.			
ELEVATION=	746.	753.	760.			

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
752.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
753.7	2.6	1.5	300.

DAM BREACH DATA

BRWID	Z	ELBM	TFAIL	WSEL	FAILEL
120.	1.00	746.00	.50	753.00	753.70

STATION WML, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

MO.DA	HR.MN	PERIOD	HOURS	INFLOW	OUTFLOW	STORAGE	STAGE
1.01	.05	1	.08	4.	23.	320.	753.0
1.01	.10	2	.17	4.	23.	319.	753.0
1.01	.15	3	.25	4.	23.	319.	753.0
1.01	.20	4	.33	4.	23.	319.	753.0
1.01	.25	5	.42	4.	22.	319.	753.0
1.01	.30	6	.50	4.	22.	319.	753.0
1.01	.35	7	.58	4.	22.	319.	753.0
1.01	.40	8	.67	4.	22.	319.	753.0
1.01	.45	9	.75	4.	22.	319.	753.0
1.01	.50	10	.83	4.	22.	318.	753.0
1.01	.55	11	.92	4.	22.	318.	753.0
1.01	1.00	12	1.00	4.	22.	318.	753.0
1.01	1.05	13	1.08	4.	22.	318.	753.0
1.01	1.10	14	1.17	4.	22.	318.	753.0
1.01	1.15	15	1.25	4.	22.	318.	753.0
1.01	1.20	16	1.33	4.	22.	318.	753.0
1.01	1.25	17	1.42	4.	22.	318.	753.0
1.01	1.30	18	1.50	4.	22.	317.	753.0
1.01	1.35	19	1.58	4.	22.	317.	753.0
1.01	1.40	20	1.67	4.	21.	317.	753.0
1.01	1.45	21	1.75	4.	21.	317.	753.0
1.01	1.50	22	1.83	4.	21.	317.	753.0
1.01	1.55	23	1.92	4.	21.	317.	753.0
1.01	2.00	24	2.00	4.	21.	317.	753.0
1.01	2.05	25	2.08	4.	21.	317.	753.0
1.01	2.10	26	2.17	4.	21.	317.	753.0
1.01	2.15	27	2.25	4.	21.	316.	753.0
1.01	2.20	28	2.33	4.	21.	316.	753.0
1.01	2.25	29	2.42	4.	21.	316.	753.0
1.01	2.30	30	2.50	4.	21.	316.	753.0
1.01	2.35	31	2.58	4.	21.	316.	753.0
1.01	2.40	32	2.67	4.	21.	316.	753.0
1.01	2.45	33	2.75	4.	21.	316.	753.0
1.01	2.50	34	2.83	4.	21.	316.	753.0
1.01	2.55	35	2.92	4.	20.	315.	753.0
1.01	3.00	36	3.00	4.	20.	315.	753.0
1.01	3.05	37	3.08	4.	20.	315.	753.0
1.01	3.10	38	3.17	4.	20.	315.	753.0
1.01	3.15	39	3.25	4.	20.	315.	753.0
1.01	3.20	40	3.33	4.	20.	315.	753.0
1.01	3.25	41	3.42	4.	20.	315.	753.0
1.01	3.30	42	3.50	4.	20.	315.	753.0
1.01	3.35	43	3.58	4.	20.	315.	753.0
1.01	3.40	44	3.67	4.	20.	314.	753.0
1.01	3.45	45	3.75	4.	20.	314.	753.0
1.01	3.50	46	3.83	4.	20.	314.	753.0
1.01	3.55	47	3.92	4.	20.	314.	753.0
1.01	4.00	48	4.00	4.	20.	314.	753.0
1.01	4.05	49	4.08	4.	20.	314.	753.0
1.01	4.10	50	4.17	4.	20.	314.	753.0
1.01	4.15	51	4.25	4.	19.	314.	753.0
1.01	4.20	52	4.33	4.	19.	314.	753.0
1.01	4.25	53	4.42	4.	19.	313.	753.0
1.01	4.30	54	4.50	4.	19.	313.	753.0
1.01	4.35	55	4.58	4.	19.	313.	753.0
1.01	4.40	56	4.67	4.	19.	313.	753.0
1.01	4.45	57	4.75	4.	19.	313.	753.0
1.01	4.50	58	4.83	4.	19.	313.	753.0
1.01	4.55	59	4.92	4.	19.	313.	753.0
1.01	5.00	60	5.00	4.	19.	313.	752.9
1.01	5.05	61	5.08	4.	19.	313.	752.9
1.01	5.10	62	5.17	4.	19.	313.	752.9
1.01	5.15	63	5.25	4.	19.	312.	752.9
1.01	5.20	64	5.33	4.	19.	312.	752.9
1.01	5.25	65	5.42	4.	19.	312.	752.9
1.01	5.30	66	5.50	4.	19.	312.	752.9
1.01	5.35	67	5.58	4.	19.	312.	752.9
1.01	5.40	68	5.67	4.	18.	312.	752.9
1.01	5.45	69	5.75	4.	18.	312.	752.9
1.01	5.50	70	5.83	4.	18.	312.	752.9
1.01	5.55	71	5.92	4.	18.	312.	752.9
1.01	6.00	72	6.00	4.	18.	312.	752.9
1.01	6.05	73	6.08	4.	18.	311.	752.9
1.01	6.10	74	6.17	4.	18.	311.	752.9
1.01	6.15	75	6.25	4.	18.	311.	752.9
1.01	6.20	76	6.33	4.	18.	311.	752.9
1.01	6.25	77	6.42	4.	18.	311.	752.9
1.01	6.30	78	6.50	4.	18.	311.	752.9
1.01	6.35	79	6.58	4.	18.	311.	752.9
1.01	6.40	80	6.67	4.	18.	311.	752.9
1.01	6.45	81	6.75	4.	18.	311.	752.9
1.01	6.50	82	6.83	4.	18.	311.	752.9
1.01	6.55	83	6.92	4.	18.	310.	752.9
1.01	7.00	84	7.00	4.	18.	310.	752.9
1.01	7.05	85	7.08	4.	18.	310.	752.9
1.01	7.10	86	7.17	4.	18.	310.	752.9
1.01	7.15	87	7.25	4.	17.	310.	752.9
1.01	7.20	88	7.33	4.	17.	310.	752.9

END-OF-PERIOD HYDROGRAPH ORDINATES

MO.DA	HR.MN	PERIOD	HOURS	INFLOW	OUTFLOW	STORAGE	STAGE
1.01	7.25	89	7.42	4.	17.	310.	752.9
1.01	7.30	90	7.50	4.	17.	310.	752.9
1.01	7.35	91	7.58	4.	17.	310.	752.9
1.01	7.40	92	7.67	4.	17.	310.	752.9
1.01	7.45	93	7.75	4.	17.	310.	752.9
1.01	7.50	94	7.83	4.	17.	309.	752.9
1.01	7.55	95	7.92	4.	17.	309.	752.9
1.01	8.00	96	8.00	4.	17.	309.	752.9
1.01	8.05	97	8.08	4.	17.	309.	752.9
1.01	8.10	98	8.17	4.	17.	309.	752.9
1.01	8.15	99	8.25	4.	17.	309.	752.9
1.01	8.20	100	8.33	4.	17.	309.	752.9
1.01	8.25	101	8.42	4.	17.	309.	752.9
1.01	8.30	102	8.50	4.	17.	309.	752.9
1.01	8.35	103	8.58	4.	17.	309.	752.9
1.01	8.40	104	8.67	4.	17.	309.	752.9
1.01	8.45	105	8.75	4.	17.	308.	752.9
1.01	8.50	106	8.83	4.	16.	308.	752.9
1.01	8.55	107	8.92	4.	16.	308.	752.9
1.01	9.00	108	9.00	4.	16.	308.	752.9
1.01	9.05	109	9.08	5.	16.	308.	752.9
1.01	9.10	110	9.17	7.	16.	308.	752.9
1.01	9.15	111	9.25	9.	16.	308.	752.9
1.01	9.20	112	9.33	13.	16.	308.	752.9
1.01	9.25	113	9.42	16.	16.	308.	752.9
1.01	9.30	114	9.50	21.	16.	308.	752.9
1.01	9.35	115	9.58	25.	16.	308.	752.9
1.01	9.40	116	9.67	29.	16.	308.	752.9
1.01	9.45	117	9.75	33.	16.	308.	752.9
1.01	9.50	118	9.83	37.	16.	308.	752.9
1.01	9.55	119	9.92	40.	17.	308.	752.9
1.01	10.00	120	10.00	42.	17.	309.	752.9
1.01	10.05	121	10.08	45.	17.	309.	752.9
1.01	10.10	122	10.17	47.	17.	309.	752.9
1.01	10.15	123	10.25	48.	17.	309.	752.9
1.01	10.20	124	10.33	50.	17.	309.	752.9
1.01	10.25	125	10.42	51.	17.	310.	752.9
1.01	10.30	126	10.50	52.	17.	310.	752.9
1.01	10.35	127	10.58	53.	17.	310.	752.9
1.01	10.40	128	10.67	54.	18.	310.	752.9
1.01	10.45	129	10.75	54.	18.	311.	752.9
1.01	10.50	130	10.83	55.	18.	311.	752.9
1.01	10.55	131	10.92	56.	18.	311.	752.9
1.01	11.00	132	11.00	56.	18.	311.	752.9
1.01	11.05	133	11.08	57.	18.	312.	752.9
1.01	11.10	134	11.17	57.	18.	312.	752.9
1.01	11.15	135	11.25	58.	19.	312.	752.9
1.01	11.20	136	11.33	58.	19.	313.	752.9
1.01	11.25	137	11.42	59.	19.	313.	752.9
1.01	11.30	138	11.50	59.	19.	313.	753.0
1.01	11.35	139	11.58	59.	19.	313.	753.0
1.01	11.40	140	11.67	60.	19.	314.	753.0
1.01	11.45	141	11.75	60.	20.	314.	753.0
1.01	11.50	142	11.83	60.	20.	314.	753.0
1.01	11.55	143	11.92	61.	20.	314.	753.0
1.01	12.00	144	12.00	61.	20.	315.	753.0
1.01	12.05	145	12.08	64.	20.	315.	753.0
1.01	12.10	146	12.17	71.	20.	315.	753.0
1.01	12.15	147	12.25	84.	21.	316.	753.0
1.01	12.20	148	12.33	106.	21.	316.	753.0
1.01	12.25	149	12.42	139.	21.	317.	753.0
1.01	12.30	150	12.50	182.	22.	318.	753.0
1.01	12.35	151	12.58	231.	23.	319.	753.0
1.01	12.40	152	12.67	282.	23.	321.	753.0
1.01	12.45	153	12.75	334.	24.	323.	753.0
1.01	12.50	154	12.83	383.	26.	325.	753.0
1.01	12.55	155	12.92	429.	27.	328.	753.1
1.01	13.00	156	13.00	470.	29.	331.	753.1
1.01	13.05	157	13.08	505.	31.	334.	753.1
1.01	13.10	158	13.17	534.	32.	337.	753.1
1.01	13.15	159	13.25	561.	34.	341.	753.2
1.01	13.20	160	13.33	586.	36.	344.	753.2
1.01	13.25	161	13.42	611.	39.	348.	753.2
1.01	13.30	162	13.50	636.	41.	352.	753.2
1.01	13.35	163	13.58	661.	43.	356.	753.3
1.01	13.40	164	13.67	685.	45.	361.	753.3
1.01	13.45	165	13.75	707.	48.	365.	753.3
1.01	13.50	166	13.83	727.	50.	370.	753.4
1.01	13.55	167	13.92	746.	53.	374.	753.4
1.01	14.00	168	14.00	763.	56.	379.	753.4
1.01	14.05	169	14.08	778.	58.	384.	753.5
1.01	14.10	170	14.17	793.	61.	389.	753.5
1.01	14.15	171	14.25	809.	64.	394.	753.5
1.01	14.20	172	14.33	826.	66.	399.	753.6
1.01	14.25	173	14.42	847.	69.	405.	753.6
1.01	14.30	174	14.50	870.	72.	410.	753.7
1.01	14.35	175	14.58	894.	75.	416.	753.7
1.01	14.40	176	14.67	919.	86.	421.	753.7

END-OF-PERIOD HYDROGRAPH ORDINATES

MO.DA	HR.MN	PERIOD	HOURS	INFLOW	OUTFLOW	STORAGE	STAGE
BEGIN DAM FAILURE AT 14.67 HOURS							
1.01	14.45	177	14.75	944.	676.	425.	753.8
1.01	14.50	178	14.83	967.	1682.	424.	753.7
1.01	14.55	179	14.92	988.	2922.	415.	753.7
1.01	15.00	180	15.00	1008.	4323.	397.	753.6
1.01	15.05	181	15.08	1023.	5807.	369.	753.4
1.01	15.10	182	15.17	1035.	7323.	331.	753.1
1.01	15.15	183	15.25	1046.	6814.	290.	752.8
1.01	15.20	184	15.33	1059.	6333.	252.	752.5
1.01	15.25	185	15.42	1078.	5869.	217.	752.2
1.01	15.30	186	15.50	1122.	5419.	186.	751.8
1.01	15.35	187	15.58	1220.	4988.	158.	751.5
1.01	15.40	188	15.67	1379.	4584.	134.	751.2
1.01	15.45	189	15.75	1595.	4220.	114.	751.0
1.01	15.50	190	15.83	1866.	3905.	98.	750.7
1.01	15.55	191	15.92	2168.	3650.	86.	750.5
1.01	16.00	192	16.00	2437.	3458.	77.	750.4
1.01	16.05	193	16.08	2628.	3321.	71.	750.2
1.01	16.10	194	16.17	2733.	3223.	67.	750.2
1.01	16.15	195	16.25	2757.	3148.	64.	750.1
1.01	16.20	196	16.33	2706.	3081.	61.	750.0
1.01	16.25	197	16.42	2603.	3012.	59.	750.0
1.01	16.30	198	16.50	2462.	2932.	56.	749.9
1.01	16.35	199	16.58	2292.	2837.	52.	749.8
1.01	16.40	200	16.67	2125.	2726.	48.	749.7
1.01	16.45	201	16.75	1983.	2603.	44.	749.6
1.01	16.50	202	16.83	1867.	2473.	40.	749.5
1.01	16.55	203	16.92	1773.	2342.	36.	749.4
1.01	17.00	204	17.00	1698.	2215.	32.	749.3
1.01	17.05	205	17.08	1633.	2094.	29.	749.1
1.01	17.10	206	17.17	1579.	1981.	26.	749.0
1.01	17.15	207	17.25	1533.	1878.	23.	748.9
1.01	17.20	208	17.33	1492.	1786.	21.	748.8
1.01	17.25	209	17.42	1454.	1703.	19.	748.7
1.01	17.30	210	17.50	1418.	1630.	18.	748.7
1.01	17.35	211	17.58	1384.	1565.	16.	748.6
1.01	17.40	212	17.67	1353.	1507.	15.	748.5
1.01	17.45	213	17.75	1325.	1457.	14.	748.5
1.01	17.50	214	17.83	1301.	1412.	13.	748.4
1.01	17.55	215	17.92	1280.	1373.	12.	748.4
1.01	18.00	216	18.00	1262.	1340.	12.	748.3
1.01	18.05	217	18.08	1246.	1312.	11.	748.3
1.01	18.10	218	18.17	1227.	1287.	11.	748.3
1.01	18.15	219	18.25	1204.	1262.	11.	748.2
1.01	18.20	220	18.33	1172.	1236.	10.	748.2
1.01	18.25	221	18.42	1128.	1206.	10.	748.2
1.01	18.30	222	18.50	1074.	1168.	9.	748.1
1.01	18.35	223	18.58	1013.	1122.	8.	748.1
1.01	18.40	224	18.67	949.	1067.	8.	748.0
1.01	18.45	225	18.75	886.	1007.	7.	747.9
1.01	18.50	226	18.83	826.	943.	6.	747.9
1.01	18.55	227	18.92	772.	879.	5.	747.8
1.01	19.00	228	19.00	724.	818.	4.	747.7
1.01	19.05	229	19.08	684.	761.	4.	747.6
1.01	19.10	230	19.17	652.	713.	3.	747.5
1.01	19.15	231	19.25	629.	674.	3.	747.5
1.01	19.20	232	19.33	619.	646.	3.	747.4
1.01	19.25	233	19.42	610.	628.	3.	747.4
1.01	19.30	234	19.50	602.	617.	3.	747.4
1.01	19.35	235	19.58	594.	608.	2.	747.4
1.01	19.40	236	19.67	586.	599.	2.	747.4
1.01	19.45	237	19.75	578.	590.	2.	747.4
1.01	19.50	238	19.83	571.	582.	2.	747.3
1.01	19.55	239	19.92	565.	575.	2.	747.3
1.01	20.00	240	20.00	558.	568.	2.	747.3
1.01	20.05	241	20.08	552.	561.	2.	747.3
1.01	20.10	242	20.17	546.	555.	2.	747.3
1.01	20.15	243	20.25	541.	549.	2.	747.3
1.01	20.20	244	20.33	535.	543.	2.	747.3
1.01	20.25	245	20.42	530.	538.	2.	747.3
1.01	20.30	246	20.50	525.	532.	2.	747.3
1.01	20.35	247	20.58	520.	527.	2.	747.3
1.01	20.40	248	20.67	516.	522.	2.	747.3
1.01	20.45	249	20.75	511.	517.	2.	747.2
1.01	20.50	250	20.83	507.	513.	2.	747.2

1.01	20.55	251	20.92	503.	508.	2.	747.2
1.01	21.00	252	21.00	499.	504.	2.	747.2
1.01	21.05	253	21.08	495.	500.	2.	747.2
1.01	21.10	254	21.17	491.	496.	2.	747.2
1.01	21.15	255	21.25	487.	492.	2.	747.2
1.01	21.20	256	21.33	484.	489.	2.	747.2
1.01	21.25	257	21.42	480.	485.	2.	747.2
1.01	21.30	258	21.50	477.	482.	2.	747.2
1.01	21.35	259	21.58	474.	478.	2.	747.2
1.01	21.40	260	21.67	471.	475.	2.	747.2
1.01	21.45	261	21.75	468.	472.	1.	747.2
1.01	21.50	262	21.83	465.	468.	1.	747.2
1.01	21.55	263	21.92	462.	465.	1.	747.2
1.01	22.00	264	22.00	459.	462.	1.	747.2
1.01	22.05	265	22.08	456.	459.	1.	747.2
1.01	22.10	266	22.17	453.	457.	1.	747.1
1.01	22.15	267	22.25	450.	454.	1.	747.1
1.01	22.20	268	22.33	448.	451.	1.	747.1
1.01	22.25	269	22.42	445.	448.	1.	747.1
1.01	22.30	270	22.50	443.	446.	1.	747.1
1.01	22.35	271	22.58	440.	443.	1.	747.1
1.01	22.40	272	22.67	438.	441.	1.	747.1
1.01	22.45	273	22.75	435.	438.	1.	747.1
1.01	22.50	274	22.83	433.	436.	1.	747.1
1.01	22.55	275	22.92	430.	433.	1.	747.1
1.01	23.00	276	23.00	428.	431.	1.	747.1
1.01	23.05	277	23.08	426.	428.	1.	747.1
1.01	23.10	278	23.17	423.	426.	1.	747.1
1.01	23.15	279	23.25	421.	424.	1.	747.1
1.01	23.20	280	23.33	419.	421.	1.	747.1
1.01	23.25	281	23.42	417.	419.	1.	747.1
1.01	23.30	282	23.50	414.	417.	1.	747.1
1.01	23.35	283	23.58	412.	415.	1.	747.1
1.01	23.40	284	23.67	410.	413.	1.	747.1
1.01	23.45	285	23.75	408.	411.	1.	747.1
1.01	23.50	286	23.83	406.	409.	1.	747.1
1.01	23.55	287	23.92	404.	407.	1.	747.1
1.02	0.00	288	24.00	403.	405.	1.	747.1
1.02	.05	289	24.08	401.	403.	1.	747.1
1.02	.10	290	24.17	399.	401.	1.	747.1
1.02	.15	291	24.25	397.	399.	1.	747.0
1.02	.20	292	24.33	395.	397.	1.	747.0
1.02	.25	293	24.42	393.	395.	1.	747.0
1.02	.30	294	24.50	391.	393.	1.	747.0
1.02	.35	295	24.58	389.	391.	1.	747.0
1.02	.40	296	24.67	387.	389.	1.	747.0
1.02	.45	297	24.75	385.	387.	1.	747.0
1.02	.50	298	24.83	383.	385.	1.	747.0
1.02	.55	299	24.92	381.	383.	1.	747.0
1.02	1.00	300	25.00	379.	381.	1.	747.0

PEAK OUTFLOW IS 7323. AT TIME 15.17 HOURS

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HYDROGRAPH ROUTING

CHANNEL ROUTING REACH 1

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SFL
.1000	.0400	.1000	732.0	740.0	250.	.01000

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

0.00 740.00 10.00 738.00 110.00 738.00 180.00 732.00 190.00 732.00
220.00 734.00 340.00 734.00 390.00 740.00

STORAGE	0.00	.04	.10	.19	.31	.53	.99	1.47	1.97	2.49
	3.03	3.59	4.17	4.77	5.39	6.21	7.11	8.01	8.94	9.87
OUTFLOW	0.00	11.20	44.68	106.51	202.69	347.90	603.03	945.34	1367.09	1865.29
	2438.67	3086.82	3809.87	4608.29	5482.78	6541.67	7752.89	9073.70	10498.04	12022.06
STAGE	732.00	732.42	732.84	733.26	733.68	734.11	734.53	734.95	735.37	735.79
	736.21	736.63	737.05	737.47	737.89	738.32	738.74	739.16	739.58	740.00
FLOW	0.00	11.20	44.68	106.51	202.69	347.90	603.03	945.34	1367.09	1865.29
	2438.67	3086.82	3809.87	4608.29	5482.78	6541.67	7752.89	9073.70	10498.04	12022.06

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	7145.	2093.	615.	591.	177432.
CMS	202.	59.	17.	17.	5024.
INCHES		6.71	7.89	7.90	7.90
MM		170.56	200.50	200.78	200.78
AC-FT		1038.	1220.	1222.	1222.
THOUS CU M		1280.	1505.	1507.	1507.

MAXIMUM STORAGE = 7.

MAXIMUM STAGE IS 738.5

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HYDROGRAPH ROUTING

CHANNEL ROUTING REACH 2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.1000	.0400	.1000	712.0	720.0	900.	.02000

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

0.00 720.00 50.00 716.00 100.00 712.00 108.00 712.00 118.00 716.00
123.00 718.00 140.00 718.00 145.00 720.00

STORAGE	0.00	.10	.25	.46	.72	1.03	1.41	1.83	2.31	2.85
	3.44	4.09	4.79	5.55	6.36	7.34	8.41	9.53	10.71	11.94
OUTFLOW	0.00	10.97	38.16	81.75	143.18	224.08	326.15	451.08	600.50	776.05
	979.31	1211.82	1475.10	1770.62	2099.84	2497.79	2952.86	3453.35	3998.92	4589.75
STAGE	712.00	712.42	712.84	713.26	713.68	714.11	714.53	714.95	715.37	715.79
	716.21	716.63	717.05	717.47	717.89	718.32	718.74	719.16	719.58	720.00
FLOW	0.00	10.97	38.16	81.75	143.18	224.08	326.15	451.08	600.50	776.05
	979.31	1211.82	1475.10	1770.62	2099.84	2497.79	2952.86	3453.35	3998.92	4589.75

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	7177.	2092.	615.	591.	177218.
CMS	203.	59.	17.	17.	5018.
INCHES		6.71	7.88	7.90	7.90
MM		170.42	200.27	200.54	200.54
AC-FT		1337.	1219.	1221.	1221.
THOUS CU M		1279.	1503.	1505.	1505.

MAXIMUM STORAGE = 17.

MAXIMUM STAGE IS 721.8

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SUMMARY OF DAM SAFETY ANALYSIS *MT HOPE LAKE*

.....	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	797.00	796.50	802.00
STORAGE	633.	543.	1953.
OUTFLOW	4.	0.	858.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.50	800.42	0.00	1478.	519.	0.00	18.58	0.00

SUMMARY OF DAM SAFETY ANALYSIS *WHITE MEADOW LAKE*

.....	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	753.00	752.70	753.70
STORAGE	320.	280.	417.
OUTFLOW	23.	0.	76.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.50	753.76	.06	426.	7323.	.31	15.17	14.67

PLAN 1 STATION 1

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.50	7145.	738.5	15.17

PLAN 1 STATION 2

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.50	7177.	721.8	15.25

SUMMARY OF DAM SAFETY ANALYSIS

NON-BREACH DOWNSTREAM ROUTING

.....		INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
	ELEVATION	753.00	752.70	753.70
	STORAGE	320.	280.	417.
	OUTFLOW	23.	0.	76.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.50	755.08	1.38	618.	1556.	10.42	17.25	0.00

PLAN 1 STATION 1

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.50	1556.	735.5	17.25

PLAN 1 STATION 2

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.50	1556.	717.2	17.25

APPENDIX 5

Bibliography

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